

Submittal Review Comments

Date: 29 August 2023

Project: York Technical College
Dental Clinic Renovation - Bldg A
State Project No. H59-6232-CL
DP3 Project No. 22273

To: Tyler White
JM Cope Construction
199 S Cherry Rd
Rock Hill, SC 29730

From: Austin Seay

DATA SHEET FCU 1-4 ON PAGE 42
DATA SHEET FCU 5 ON PAGE 43
DATA SHEET FCU 6 ON PAGE 44

Sent Via: E-Mail

Item(s) Reviewed
Fan Coil Unit Submittal

Review By Architect Consultant Others

Reviewed Fabrication/installation may be undertaken.

Furnish as Corrected Approval does not authorize changes in the
Contract Sum or Time unless documented by
Change Order or Construction Change Directive.

Rejected Fabrication/installation may not be undertaken. In
resubmitting limit corrections to the item(s) marked

Revise and Re-submit

Submit Specific Item

This review is only for general conformance with the design concept of the Project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences, and procedures of construction; coordination of the Work of all trades; and for performing all work in a safe and satisfactory manner

Review Comments are: as noted below as noted on Submittal

DP3 Architects, Ltd.
15 South Main Street
Suite 400
Greenville, SC 29601
864.232.8200

www.DP3architects.com



SUBCONTRACTOR SUBMITTAL FORM

Form must be filled out correctly and completely to receive a returned submittal

Company Name: _____

Contact: _____

Phone: _____

Email: _____

Project Name & Number: _____

Bid Category Name & Number: _____

Submittal Number: _____

Specification Section Number: _____

Submittal Description: _____

Specification Description: _____

Manufacturer / Supplier: _____

Material lead time from date of approval: _____

Type of Submittal:

Plans _____ Product Data _____ Shop Drawings _____ Test Results _____ Samples _____ LEED _____

Is this a re-submittal? _____ No _____ Yes If Yes, reference original submittal # _____

Remarks: _____

Construction Manager Review

Architect / Engineer Review

JM Cope

Trans ittal # _____

Section # _____

	REVIEWED	Subject to Design Professional Review
	REVIEWED AS NOTED	Subject to Design Professional Review
REVISE AND RESUBMIT		

Shop drawings have been reviewed for compliance requirements. All material measurements, operating characteristics, etc., are assumed to be in full compliance with contract documents and remain the responsibility of the subcontractor and/or material supplier.

Date _____

Name _____

Engineer comments provided on page 3.

08/28/2023 - JAS

Action: Comments Noted

Project Name: YTC Bldg A Dental Clinic Renovation
 Project Number: 03220823.A0
 Submittal ID: 238219-1.0
 Received On: 8/11/2023

REVIEW IS FOR GENERAL COMPLIANCE WITH THE CONTRACT. NO CONTRACT REQUIREMENTS ARE WAIVED BY THIS REVIEW. CONTRACTOR IS RE-SPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

RMF Engineering, Inc., PC
CONSULTING ENGINEERS

Reviewed On: 8/28/2023 Reviewed By: JAS



EQUIPMENT SUBMITTAL FOR APPROVAL

PROJECT: YORK TECHNICAL COLLEGE
DENTAL CLINIC

LOCATION: 452 ANDERSON RD S. BLDG A
ROCK HILL, SC 29730



EQUIPMENT:	FNP Horizontal, High-Performance, Plenum Return AHD Direct Drive Blower Coil
DRAWING SECTION:	Hydronic Fan Coil Unit Schedule, Sheet M4.1 Dated 05 Jun 2023
UNIT TAGS:	FCU-X
QUANTITY:	6
REVISION:	0

DATE: 08/08/2023

CONSULTING ENGINEER: RMF Engineering, Inc.
194 Seven Farm Dr. Ste G
Charleston, SC 29492

SOLD TO: Action Mechanical Contractors, Inc.
3228 Nevada Blvd
Charlotte, NC 28273

PREPARED BY: Jered Williams
Johnson Controls, Inc.
9844-B Southern Pine Blvd.
Charlotte, NC 28273
P: (704) 713-5861
Email: jered.williams@jci.com

NOTES FOR CLARIFICATION

- Please verify hand connections for the piping locations prior to release. Please see the “FCU Configurations” section of this submittal for more information.
- Blower coil does not allow for a ceiling access panel, but due to airflow rating was required. Max airflow on FNP at 0.75” ESP is 1750 cfm. (Please see FCU-5 Fan curve for more detail).
- Blower coils do not have the optional pipe package that is included with the FNP units and will need to be furnished separately.
- All units chosen include CW-HW(Reheat).
- All units are limited to MERV 8 by software due to static capabilities of motor. Please notify if MERV 13 is required for spare filters as they can be provided separately. Units will ship with MERV 8 unless MERV 13 required as construction set if MERV 8 deemed unacceptable.

Submittal has been reviewed for conformance with the Fan Coil Unit specification section and contract drawings only. Hydronic Piping, valves, insulation, etc. shall be submitted separately for engineer review under the appropriate specification sections to confirm compliance.

Coordinate **all** access panel, unit installation, and coil connection locations with architectural plans and coordinated shop drawings to ensure ease of maintenance is provided for all internal and external FCU components requiring access for maintenance prior to release.

Provide MERV-13 filters per specification section 238219 2.02. Per conversation with JCI Representative Jered Williams on 08/28/2023, MERV-13 filters can be provided and supported with the currently selected fans and ECM motors. Fan total static pressure shall be balanced during project test and balance with the MERV-13 filters installed at the scheduled CFMs and air device total airflow.

TABLE OF CONTENTS

- Bill of Materials
- FCU Configurations
- Guide Specifications
- Performance Data Sheets
- Drawings
- Warranty
- Equipment Release Form

BILL OF MATERIALS

Items Included by Johnson Controls

- (5) FNP Horizontal, High-Performance, Plenum Return FCUs, with the following accessories:
 - 115/1/60 Voltage ECM Motor
 - 115/1/60
 - 2-10VDC Speed Control (Signal from BAS)
 - 3 Year parts only warranty from shipment
 - Chilled Water Coil
 - Auto Air Vent
 - Factory Mounted Piping package:
 - 2 Way control valve with ball valves
 - Manual ball valve with memory stop
 - P/T ports, unions, Y-Strainer w/ Blowdown
 - 2-Position control valve, Proportional, Fail-in-place
 - Hot Water Coil (Re-heat)
 - Auto Air Vent
 - Factory Mounted Piping package:
 - 2 Way control valve with ball valves
 - Manual ball valve with memory stop
 - P/T ports, unions, Y-Strainer w/ Blowdown
 - 2-Position control valve, Proportional, Fail-in-place
 - Unit Options:
 - 2" MERV 8 Filter, 2 Spare filter
 - Side Filter Access
 - Galvanized Casing
 - Foil Faced Insulation
 - Non-Fused Door Interlocking Disconnect Switch
 - Unit Start/Stop Relay / Fan Operation Relay / Transformer

Items NOT Included

- Options not explicitly listed above
- Provisions for Hanging
- Labor warranty
- Condensate pumps
- DDC BacNet Interface
- Unit Startup
- Commissioning or TAB Labor
- Hauling, rigging, or installation labor
- MERV 13 Filters
- Main fusing
- Solid Ceiling Access Panel
- T-stats (Provided with DDC Controls, by others)

Items Included by Johnson Controls

- (1) AHD **Direct Drive Blower** Coil Unit, with the following accessories:
 - **115/1/60** Voltage ECM Motor
 - 115/1/60
 - 2-10VDC Speed Control (Signal from BAS)
 - 3 Year parts only warranty from shipment
 - **Chilled Water Coil**
 - **Hot Water Coil** (Re-heat)
 - Unit Options:
 - 2" MERV 8 Filter, 2 Spare filter
 - Galvanized Casing
 - Foil Faced Insulation
 - Rubber In Shear Vibration Isolators – Ceiling Hung
 - Non-Fused Door Interlocking Disconnect Switch
 - Unit Start/Stop Relay / Fan Operation Relay / Transformer
 - Control Enclosure Alternate Location 2

Items NOT Included

- Options not explicitly listed above
- Piping Package
- Labor warranty
- Condensate pumps
- DDC BacNet Interface
- Unit Startup
- Commissioning or TAB Labor
- Hauling, rigging, or installation labor
- MERV 13
- Main fusing
- Solid Ceiling Access Panel
- T-stats (Provided with DDC Controls, by others)

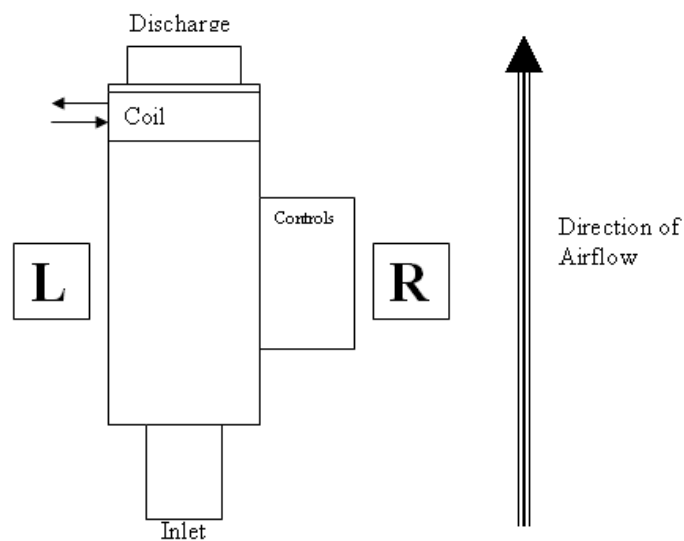
FCU CONFIGURATIONS

FCU CONFIGS

CONFIGURATION OF TERMINAL UNITS

For VAV boxes, configuration (or arrangement) describes the side of the box the control enclosure and coil connection is on. The controls and coil do not have to be on the same side of the box.

The orientation of the box (right vs. left) is determined by air flow. See the diagram below.



. In this example, the controls are Right Hand and the coil is Left Hand.

For fan coil units, configuration describes the side of the unit the coil and drain connections are on. The orientation of the unit is determined by air flow in the same manner as for VAV boxes described above.

GUIDE SPECIFICATIONS

GUIDE SPECS

FN Fan Coil Guide Specifications

GENERAL

Furnish and install Johnson Controls Model FN Horizontal Concealed Direct Drive Fan Coil Units where indicated on the plans and in the specifications. Units shall be completely factory assembled, tested and shipped as one piece. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions for each model and size shall be considered maximums. Units shall be ETL listed in compliance with UL/ANSI Standard 1995, and be certified as complying with the latest edition of ARI Standard 440.

CONSTRUCTION

All unit chassis shall be fabricated of heavy gauge galvanized steel panels able to meet 125 hour salt spray test per ASTM B-117. All exterior panels shall be insulated with 1/2" thick fiberglass insulation with a maximum k value of .24 (BTU • in) / (hr • ft² • °F) and rated for a maximum air velocity of 5000 f.p.m. Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A.

Option: Provide Elastomeric Closed Cell Foam Insulation in lieu of standard. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Polyethylene insulation is not acceptable. All concealed units shall have a minimum 1 1/4" duct collar on the discharge. Plenum units shall have a minimum 1" duct collar on the return.

SOUND

Manufacturer shall provide AHRI 260 sound power data at any specified airflow and static pressure.

FAN ASSEMBLY

Unit fan shall be a dynamically balanced, forward curved; DWDI centrifugal type constructed of galvanized steel for corrosion resistance. Motors shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with UL and CSA listed automatic reset thermal overload protection and three separate horsepower taps. Single speed motors are not acceptable.

The fan assembly shall be easily removable for servicing the motor and blower at, or away from the unit. The entire fan assembly shall be able to come out of the unit by removing four nuts per fan and unplugging the motor(s). Plenum unit fan assemblies shall be easily serviced through the filter opening or through the bottom panel.

Option: Provide Electronically Commutated (EC) Motor capable of operation with low voltage 3 speed thermostat. Motor shall come factory programmed and configured for 3 speed operation.

Option: Motor shall be capable of accepting a 2-10 VDC output from BAS.

COILS

All coils shall be ARI 410 certified and tagged with an ARI 410 label.

All cooling and heating coils shall optimize rows, circuit count, and fin density to meet the specified capacity. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin. Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.

All coils shall be hydrostatically tested at 450 PSIG air pressure under water, and rated for a maximum of 450 PSIG working pressure at 200°F.

Direct expansion cooling coils shall include a fixed orifice distributor. All evaporator coils shall be factory sealed and charged with a minimum 5 PSIG nitrogen or refrigerated dry air. Steam coils shall be standard steam type suitable for temperatures above 35°F and 15 PSIG maximum working pressure.

FN Fan Coil Guide Specifications

All coils shall be provided with a manual air vent fitting to allow for coil venting.

Option: Provide automatic air vents in lieu of manual air vents. Cooling and heating coils shall be in a common tube sheet. Water coils on concealed models shall be field reversible for right or left hand connections.

DRAIN PANS

Primary condensate drain pans shall be single wall; heavy gauge galvanized steel for corrosion resistance, and extend under the entire cooling coil. Drain pans shall be of one-piece construction and be positively sloped for condensate removal. Drain pan shall be removable without the use of tools.

The drain pan shall be externally insulated with fire retardant, closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

Option: Provide a single wall primary drain pan constructed entirely of heavy gauge stainless steel for superior corrosion resistance. Stainless steel drain pans shall be externally insulated and meet or exceed the requirements stated above.

Option: Provide a condensate overflow switch in the primary drain pan for condensate overflow.

FILTERS

All plenum and exposed units shall be furnished with a minimum 1" nominal glass fiber throwaway filter. Filters shall be tight fitting to prevent air bypass. Plenum and exposed unit filters shall be easily removable from the bottom of the unit without the need for tools.

Option: Provide unit with 1" or 2" pleated filters rated at MERV 8 based on ASHRAE 52.2 - 1999.

ELECTRICAL

Units shall be furnished with single point power connection. Provide an electrical junction box with terminal strip for motor and other electrical terminations. The factory mounted terminal wiring strip consists of a multiple position screw terminal block to facilitate wiring terminations for the electric control valves and thermostats.

ELECTRIC HEAT

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled. The heater assembly shall be designed and rated for installation on the fan coil unit without the use of duct extensions or transitions, and be located in the unit as to not expose the fan assembly to excessive leaving air temperatures that could affect motor performance.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be open coil type Ni-Chrome wire mounted in ceramic insulators and located in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware for corrosion resistance. The element support brackets shall be spaced no greater than 3-1/2" on center. All internal wiring shall be rated for 105°C minimum.

All heaters shall include over temperature protection consisting of an automatic reset primary thermal limit and back up secondary thermal limit. All heaters shall be single stage unless noted otherwise on the plans. All units with electric heat shall be provided with an incoming line power distribution block, designated to accept single point power wiring capable of carrying 125% of the calculated load current.

SECTION ONE - RECEIPT & INITIAL INSTALLATION

CODE COMPLIANCE

This equipment has been manufactured and certified in accordance with UL 1995-Standard for Safety, Heating and Cooling Equipment (CAN/CSA C22.2 NO 236-M90) and bears the Electrical Testing Laboratories (ETL) Mark under ETL Control No: 41629.

RECEIPT & INITIAL INSTALLATION



NO ATTEMPT SHOULD BE MADE TO HANDLE, INSTALL, OR SERVICE ANY UNIT WITHOUT FOLLOWING SAFE PRACTICES REGARDING MECHANICAL EQUIPMENT.

- All power must be disconnected before any installation or service should be attempted. More than one power source may be supplied to a unit. Power to remote mounted control devices may not be supplied through the unit. Never wear bulky or loose fitting clothing when working on any mechanical equipment. Gloves should only be worn when required for proper protection from heat or other possible injury. Safety glasses or goggles should always be worn when drilling, cutting, or working with chemicals such as refrigerants or lubricants.
- Never pressurize any equipment beyond specified operating pressures. Always pressure test with an inert fluid or gas such as clear water or dry nitrogen to avoid possible damage or injury in the event of a leak or component failure during testing.
- Always protect adjacent flammable material when welding or soldering. Use suitable heat shield material to contain sparks or drops of solder. Have fire extinguisher available for use when welding or brazing.

The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service, or operation of any equipment.

UNPACKING & INSPECTION

All units are carefully inspected at the factory throughout the manufacturing process under a strict detailed quality assurance program, and where possible, all major components and subassemblies are carefully tested for proper operation and verified to be in full compliance with the factory manufacturing documents. Customer furnished components such as control valves, switches and DDC controls are not factory tested.

Each unit is carefully packaged for shipment to avoid damage during normal transport and handling. The equipment should always be stored in a dry place in the proper orientation as marked on the carton.

All shipments are made F.O.B. factory and it is the responsibility of the receiving party to inspect the equipment upon arrival. Any obvious damage to the carton and/or its contents should be recorded on the bill of lading and a claim should be filed with the freight carrier.

After determining the condition of the carton exterior, carefully remove each unit from the carton and inspect for hidden damage. At this time check to make sure that “furnished only” items such as switches, thermostats, etc. are accounted for. Any hidden damage should be recorded and immediately reported to the carrier and a claim filed as before. In the event a claim for shipping damage is filed, the unit, shipping carton, and all packing must be retained for physical inspection by the freight carrier. All equipment should be stored in the factory-shipping carton with internal packing in place until installation.

At the time of receipt, the equipment type and arrangement should be verified against the order documents. Should any discrepancy be found, the local Sales Representative should be notified immediately so that the proper action may be instituted. Should any question arise concerning warranty repairs, the factory must be notified BEFORE any corrective action is taken. Where local repairs or alterations can be accomplished, the factory must be fully informed as to the extent and expected cost of those repairs before work is begun. Where factory operations are required, the factory must be contacted for authorization to return equipment and a Return Authorization Number will be issued. Unauthorized return shipments of equipment and shipments not marked with an authorization number will be refused. In addition, the manufacturer will not accept any claims for unauthorized expenses.

HANDLING & INSTALLATION

While all equipment is designed for durability and fabricated for sturdy construction and may present a rugged appearance, great care must be taken to assure that no force or pressure be applied to the coil, piping or drain stub-outs during handling. Also, depending on the options and accessories, some units could contain delicate components that may be damaged by improper handling. Wherever possible, all units should be maintained in an upright position and handled by the chassis as close as possible to the mounting point locations.

In the case of a full cabinet unit, the unit must obviously be handled by the exterior casing. This is acceptable providing the unit is again maintained in an upright position and no impact forces are applied that may damage internal components, access panels, or painted surfaces. The equipment covered in this manual IS NOT suitable for outdoor installations or hazardous/explosive environments. The equipment should never be stored or installed where it may be subjected to a hostile environment such as rain, snow, extreme temperatures or corrosive or chemical laden atmospheres.

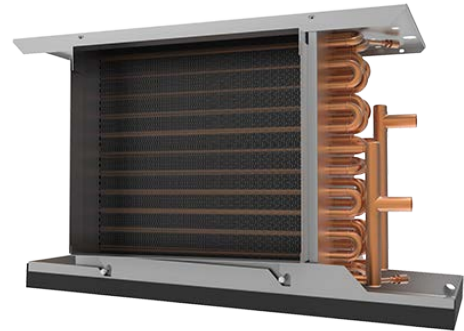
During and after installation, special care must be taken to prevent foreign material such as paint, plaster, and drywall dust from being deposited in the drain pan or on the motor or blower wheels. Failure to do so may have serious adverse effects on unit operation and in the case of the motor and blower assembly, may result in immediate or premature failure. All manufacturers' warranties are void if foreign material is allowed to be deposited on the motor or blower wheels of any unit. Some units and/or job conditions may require some form of temporary covering during construction.

While the manufacturer does not become involved in the design and selection of support methods and components, it should be noted that unacceptable system operating characteristics and/or performance might result from improper or inadequate unit structural support. In addition, adequate clearance must be provided for service and removal of the equipment and its accessory components. Anchoring the equipment in place is accomplished by using the mounting points provided and positioning the unit to maintain the unit on a LEVEL plane. All units are supplied with hanging holes for use with all thread rods. ALL hanging holes MUST be utilized when installing suspended units.



***FOR SEISMIC CERTIFIED
INSTALLATION, REFERENCE
JOHNSON CONTROLS SEISMIC
INSTALLATION DOCUMENT.***

DRAIN PAN



The sloped, insulated drain pan can be equipped with a secondary drain connection. Standard drain pans are externally insulated, single wall galvanized steel. The drain pan is easily removable for cleaning. The optional auxiliary drip pan to catch condensed moisture from valves and piping is easily attachable to the drain pan. Care must be taken to ensure that the unit drain pan does not slope away from the outlet connection.

AUXILIARY DRIP PAN



The auxiliary drip pan mounts directly to the unit drain pan using (2) #10 x 1/2" screws.

After the connections are completed, the system should then be tested for leaks. Since some components are not designed to hold pressure with a gas, hydronic systems should be tested with water.

TOOL-FREE DRAIN PAN REMOVAL

For drain pan removal, follow the four-step process illustrated below.

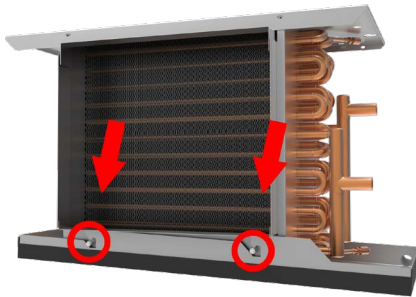


To prevent condensation drip outside of the drain pan area, drain pan retention clip must be returned to its original engagement position within the drain pan area (see below)

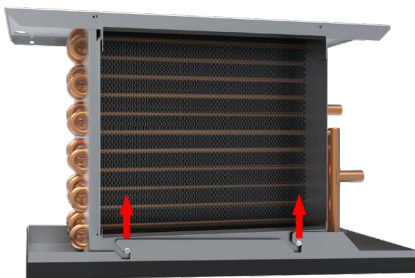
Step 1: Locate Drain Pan Retention Clip. Press Upward Until Clip Clears Edge Of Drain Pan.



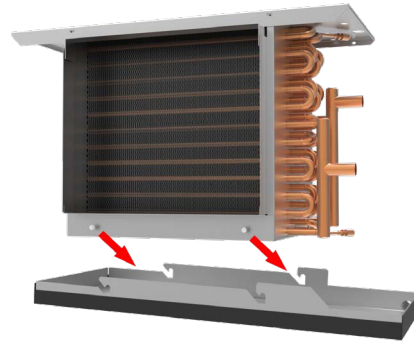
Step 2: Visually Locate Drain Pan Retention Studs.



Step 3: Apply Slight Upward Pressure to Drain Pan.



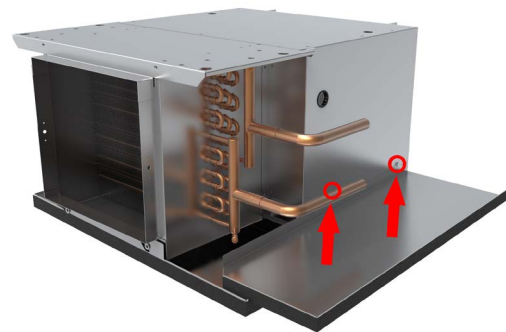
Step 4: Disengage Pan Via 45° Downward Motion, Then Remove Drain Pan From Unit



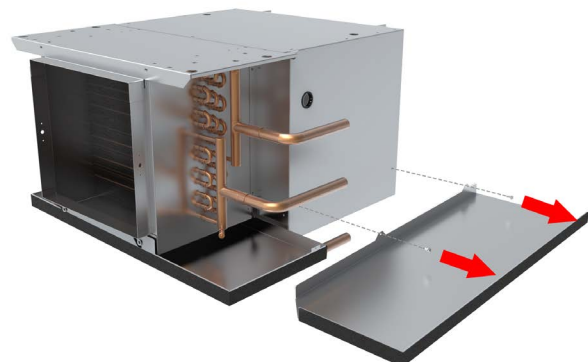
AUXILIARY DRIP PAN REMOVAL

The auxiliary drip pan is easily removable for cleaning. For auxiliary drip pan removal, follow the two-step process illustrated below, by locating and then removing the two (2) retaining screws which secure the auxiliary drip pan to the side of the main unit plenum.

Step 1: Locate The Two (2) Retaining Screws Which Secure The Auxiliary Drip Pan To The Main Unit Plenum.



Step 2: Remove Both Retaining Screws And Carefully Remove The Auxiliary Drip Pan From The Unit.





All water coils must be protected from freezing after initial filling with water. Even if the system is drained, unit coils may still hold enough water to cause damage when exposed to temperatures below freezing.

COOLING/HEATING MEDIUM CONNECTIONS

Refrigerant systems should be tested with dry nitrogen rather than air to prevent the introduction of moisture into the system. In the event that leaking or defective components are discovered, the Sales Representative must be notified BEFORE any repairs are attempted. All leaks should be repaired before proceeding with the installation.

Valves and TXVs should be secured or supported to avoid damage to coil headers or distributor tubes. All valves, pipes, and components must be sufficiently supported to ensure structural integrity and proper operation of the unit. To prevent condensation accumulation and runoff, chilled water valve packages must be insulated, or preferably, utilize a factory-provided auxiliary drip tray.

After system integrity has been established the piping should be insulated in accordance with the project specifications. ALL chilled water piping and valves or refrigerant suction piping not located over drain pans must be insulated to prevent damage from sweating. This includes factory and field piping inside the unit cabinet.

The drain should always be connected and piped to an acceptable disposal point. For proper moisture carry-off, the drain piping should be sloped away from the unit at least 1/8" per foot. A drain trap may be required by local codes and it is strongly recommended for odor containment.

RETURN AIR LOCATION

This unit is equipped with a field reversible rear or bottom ducted air return for plenum style units. To change the return air location, remove the reversible plenum box panel and the filter rack. Rotate both the reversible panel and filter rack 180 degrees. Replace the reversible panel in the old filter rack position and fasten using the supplied screws. Fasten the filter rack to the location where the reversible panel was and replace the filter(s) as described above.

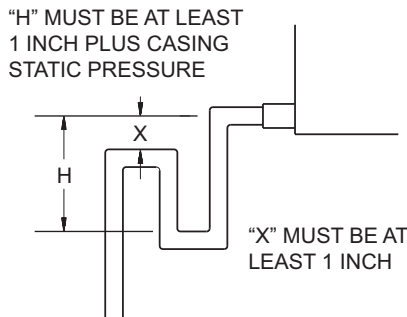


Bottom Return



Rear Return

Condensate Trap



Trap detail for positive cabinet static pressure

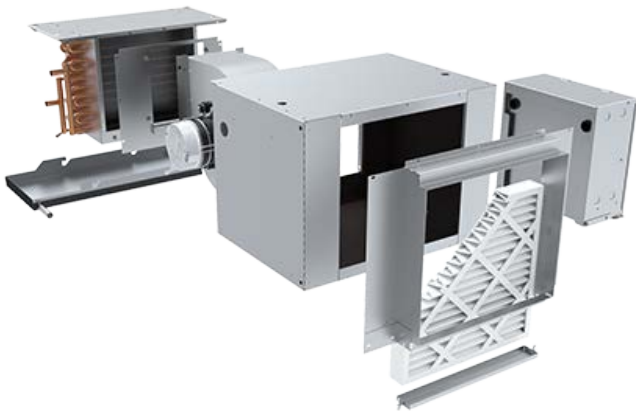
PLENUM BOX SERVICE PANEL

The service panel on the plenum box is easily removable by removing the screws located on the sides and bottom of the service panel.

PLENUM BOX REMOVAL

In most cases this unit is fully serviceable without the need for removal of the plenum box.

However, should the need arise, the plenum box is easily removable by removing the screws attaching the plenum box to the sides, top and rear of the coil casing.



COILS

All fan coils are available in 2 or 4 pipe configurations. On units with water coils, the maximum water pressure applied to the unit should never exceed 450 PSIG at 200°F.

On units with steam heating coils, the maximum steam pressure applied to the unit should never exceed 15 PSIG.

The drain piping and steam trap should be sized and routed to allow for proper condensate flow. (Minimum ambient temperature 35°F. Coils may freeze.)

PIPING CONNECTIONS



Toxic residues and loose particles resulting from manufacturing and field piping techniques such as joint compounds, soldering flux, and metal shavings may be present in the unit and the piping system. Special consideration must be given to system cleanliness when connecting to solar, domestic or potable water systems.

Submittals and Product Catalogs detailing unit operation, controls, and connections should be thoroughly reviewed BEFORE beginning the connection of the various cooling and/or heating mediums to the unit.

All accessory valve packages should be installed as required, and all valves should be checked for proper operation.

If coil and valve package connections are to be made with “sweat” or solder joint, care should be taken to assure that no components in the valve package are subjected to a high temperature which may damage seals or other materials. Many two-position electric control valves, depending on valve operation, are provided with a manual-opening lever. This lever should be placed in the “open” position during all soldering or brazing operations. Valve bodies should be wrapped with a wet rag to help dissipate heat encountered during brazing. Use a brazing alloy to make connections. Soft solder is not recommended.

If the valve package connection at the coil is made with a union, the coil side of the union must be prevented from twisting (“backed up”) during tightening to prevent damage to the coil tubing. Over-tightening must be avoided to prevent distorting the union seal surface and destroying the union. In the case of field installed valves and piping, the chilled water valve cluster (or expansion valve on DX units) should be installed in such a way that any dripping or sweating is contained in the auxiliary drip pan or other device. Valves and TXV’s should be secured or supported to avoid damage to coil headers or distributor tubes.

DUCTWORK CONNECTIONS

All ductwork and/or supply and return grilles should be installed in accordance with the project plans and specifications. If not included on the unit or furnished from the factory, Johnson Controls supply and return grilles are available in a variety of types.

All units must be installed in non-combustible areas. Some models are designed to be connected to ductwork with a MINIMUM amount of external static pressure. Consult the approved submittals and the product catalog for unit external static pressure limitations.

Units provided with outside air for ventilation should have some form of low temperature protection to prevent coil freeze-up. Outside air should be pretreated for best results.

It should be noted that none of these methods would adequately protect a coil in the event of power failure. The safest method of freeze protection is to use glycol in the proper percent solution for the coldest expected air temperature. Consult glycol supplier literature for correct solution ratios.

The manufacturer assumes no responsibility for undesirable system operation due to improper design, equipment or component selection, and/or installation of ductwork, grilles, and other field supplied components.

ELECTRICAL CONNECTIONS



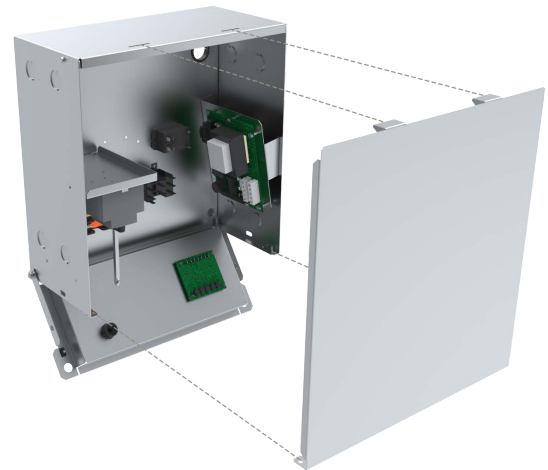
ELECTRICAL SHOCK HAZARDS. All power must be disconnected prior to installation and servicing this equipment. More than one source of power may be present. Disconnect all power sources to avoid electrocution or shock injuries.

The electrical service to the unit should be compared to the unit nameplate to verify compatibility. The routing and sizing of all conduit, and the type and sizing of all wiring and other electrical components such as circuit breakers, disconnect switches, etc. should be determined by the individual job requirements and should not be based on the size and/or type of connection provided on the equipment. All installations should be made in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor. The unit nameplate lists the unit electrical characteristics such as the required supply voltage, fan and heater amperage and required circuit ampacities. The unit-wiring diagram shows all unit and field wiring. Since each project is different and each unit on a project may be different, the installer must be familiar with the wiring diagram and nameplate on the unit BEFORE beginning any wiring. This unit is not acceptable for installation in hazardous/explosive

areas.

CONTROL ENCLOSURE

The electrical control enclosure with hinged bottom access and removable side access panel provides access to the electrical compartment. This compartment houses all electric heat and control components. Terminal strips are furnished for simple power and control wiring connections. Multiple knockouts allow wiring entries from either side of the compartment.



Control enclosure with hinged bottom access and removable side access panel

All components furnished for field installation, by either the factory or the controls contractor should be located and checked for proper function and compatibility. All internal components should be checked for shipping damage and all electrical connections should be tightened to minimize problems during start-up.

Any devices such as fan switches or thermostats that have been furnished from the factory for field installation must be wired in strict accordance with the applicable wiring diagrams. Failure to do so could result in personal injury or damage to components and will void all manufacturers' warranties. The fan motor(s) should never be controlled by any wiring or device other than the factory furnished switch or thermostat/switch combination, without factory authorization.

All field wiring should be done in accordance with governing codes and ordinances. Any modification of the unit wiring without factory authorization will result in voiding of all factory warranties and will nullify any agency listings. The manufacturer assumes no responsibility for any damages and/or injuries resulting from improperly field installed or wired components.

DRAIN

The drain should be checked before initial start-up and at the beginning of each cooling season to assure that the lines are clear. If it is clogged, steps should be taken to clear the debris so that condensate will flow easily.

Periodic checks of the drain should be made during the cooling season to maintain a free flowing condensate. Should the growth of algae and/or bacteria be a concern, consult an air conditioning and refrigeration supply organization familiar with local conditions for chemicals available to control these agents. If cleaners are used, they should be compatible with the materials of construction for the coil and drain pan.

FILTERS

This unit is equipped with a standard 1" throwaway filter most commonly used on fan coil units, and should be replaced on a regular basis. The time interval between each replacement should be established based on regular inspection of the filter and should be recorded in the log for each unit. At a minimum, filters should be inspected monthly and replaced if needed. *Refer to the Filters chart for recommended filter size for each product type and size.* If the replacement filters are not purchased from the factory, the filters used should be the same type, size and MERV rating as that furnished from or recommended by the factory. Optional 1" and 2" pleated filters are available and can be used in this unit. Contact the local Sales Representative for the correct filter upgrade specification and availability. Consult the factory for applications using filter types other than the factory standard or optional product.

FILTER REPLACEMENT

To replace the filter(s), turn the quick-release latches located at either side of the filter brackets counter-clockwise until the filter brackets can be removed. Slide out the used filter(s) and replace with the new one(s). Reattach the filter brackets by turning the quick-release latches clockwise.

Step 1: Turn Quick-Release Latches Counter-Clockwise to Disengage Filter Brackets

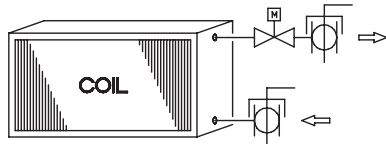


Step 2: Remove Filter Brackets and Replace Filter as Required

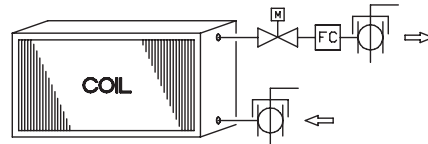


Code Descriptions: FH, FN, FW, FL Series Fan Coil Units

2-WAY PIPING PACKAGES											
Package Code	Components		Valve Size			Unions			P/T Ports	1/4" Bleed Line	Y-STR
	BVMS	FC	1/2"	3/4"	1"	1/2"	3/4"	1"			
24	•		•	•	•	•	•	•	•	•	•
25	•	•									



Code 24
2-Way Control Valve and Ball Valves With Memory Stop



Code 25
2-Way Control Valve, Ball Valves with Memory Stop, and Fixed Flow Control

LEGEND, COMPONENT PRESSURE RATINGS

BVMS:	Manual Ball Valves w/Memory Stop, 600 PSIG
FC:	Fixed Flow Control, 600 PSIG
P/T Port:	Pressure/Temperature Test Port, 400 PSIG
Union:	125 PSIG (contact factory for 600 PSIG)
Control Valve:	450 PSIG

NOTES:

1. All drawings subject to change without prior notice.
 2. Diagrams show component position in relation to fluid flow. Actual valve package configuration varies with unit type, hand connection, and pipe size.
 3. 1/4" bleed line is required on 2-pipe cool and heat auto changeover systems with factory provided thermostats; optional for thermostats by others.
- * 1" piping packages available on FN only.

Component Specifications

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.



Manual Ball Valve w/Memory Stop (BVMS)

An adjustable stop position lever to limit travel of the On/Off handle. This allows the ball valve to be closed, and returned to the balance setting position without re-testing the system. 1/2" size shown.

Nominal Size:	1/2"	3/4"	1"
Body Material:	Brass	Brass	Brass
Ball:	Hard Chrome Plated	Hard Chrome Plated	Hard Chrome Plated
Seats:	Teflon	Teflon	Teflon
Stem Seal:	(2) Viton O-Rings	Teflon	Teflon
Connection:	Sweat	Sweat	Sweat
Pressure Rating (psig):	600	600	600
Temp. Rating, °F:	325	325	325
Cv:	17	40	27



Typical 2-Way Proportional Control Valve

A 24V floating point, fail-in-place (non-spring return) proportional water control valve, driven open or closed upon a call for heating or cooling to maintain space temperature. In the open position, water can flow through the unit's water coil to heat or cool the space depending on supply water temperature. In the closed position, water cannot flow through the water coil. Factory furnished 2-way valve packages are piped normally closed to the water coil. The floating point control valve is compatible with any 24VAC three-wire signal when three minute time-out logic resides in the thermostat or system controller.

Nominal Size	1/2" 2-Way	3/4" 2-Way	1" 2-Way
Body Material:	Brass	Brass	Brass
Connection:	NPT	NPT	NPT
Pressure Rating (psig):	450	450	450
Temperature Rating, °F:	200	200	200
Cv:	1.9	4.7	7.4
Maximum Close-off Pressure			
Operating Mode (PSI):	200	200	200
Power Consumption:	3VA	3VA	3VA

Contact factory for 24V floating, spring return applications.

Component Specifications



Automatic Fixed Flow Control (FC)

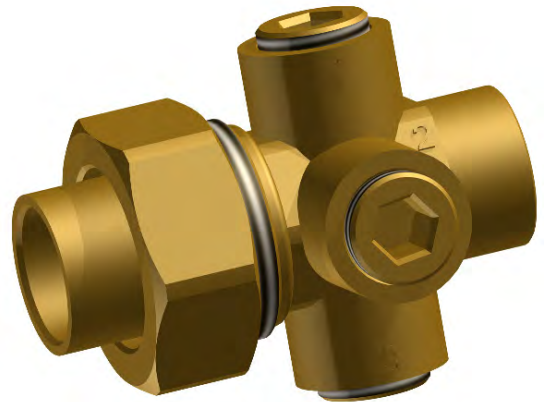
A pressure compensated automatic fixed flow control device designed to limit the flow GPM through the unit coil. Desired GPM must be specified when ordering. Device A shown is typical for controlling flow up to 8.0 GPM, and features a changeable flow cartridge. Device B is typical for flows above 8.0 GPM.

Nominal Size (A):	1/2" and 3/4"
Nominal Size (B):	3/4" and 1"
Body Material:	Copper
Connection:	Sweat
Pressure Rating (psig) (A):	600
Pressure Rating (psig) (B):	522
Temp. Rating, °F:	225
Cv:	Variable With Inlet Pressure

Unions

A fitting used to provide a mechanical connection between the coil and valve package that can be connected, disconnected, and re-connected without the need to cut tubing or unsolder a joint. Unions are installed at the coil on FH, FN and FW fan coil units. Unions are not available on FS fan coil units. For convenience, 1¼" and 1½" unions include an integrated P/T port (pictured).

Nominal Size:	1/2", 3/4", 1, 1¼", 1½"
Body Material:	Bronze/Copper
Connection:	Sweat
Pressure Rating (psig):	225
Temp. Rating, °F:	200



Component Specifications

NOTE: Photos are for representation purposes only. Vendors and models subject to change without notice.



Y-Strainer (Y-STR)

Designed to allow water to flow through a built in screen to filter debris or contaminants from the water system. With the water system isolated, the plug can be removed from the blowdown leg of the strainer and the captured debris removed from the screen. After the plug is replaced, the system can be put back in operation and the strainer will continue to filter the unit's water.

Nominal Sizes:	1/2", 3/4", 1", 1 1/4", 1 1/2"
Body Material:	Forged Brass
Connection:	Sweat
Pressure Rating (psig):	600
Temp. Rating, °F:	325
Screen:	20 Mesh Stainless Steel



Cleanout Valve for Y-Strainer (Y-CO)

A standard ball valve installed on the strainer blowdown leg to allow flushing the strainer screen without removing the plug in the blowdown leg. This valve has a standard 1/2" garden hose connection to allow fluid to be piped to a container or remote location during cleaning. Not available separately.

Nominal Size:	1/4"
Body Material:	Bronze
Connection:	MPT
Pressure Rating (psig):	600
Temp. Rating, °F:	200



Optional Pressure/Temperature Test Port Locations (P/T)

Designed to allow testing of water pressure, differential pressure or water temperature without interrupting the waterside operation of the Fan Coil Unit. Sensor probes (1/8") are not included.

Nominal Size:	1/4"
Body Material:	Brass
Connection:	MPT
Pressure Rating (psig):	400
Temp. Rating, °F:	250

FAN RELAY BOARD – INSTALLATION, OPERATION AND MAINTENANCE

The Fan Relay Board assembly (FRBii) provides electronic control for the fan motor and various connections for peripheral devices. The FRBii accepts incoming single phase power of nominal AC voltages 120, 208, 240 and 277. The assembly includes a multi-tap transformer (30VA or 50VA) that steps each of these primary voltages to 24 VAC. The assembly allows for the control of a three speed fan motor, including a relay for control of the neutral voltage signal path.

The FRBii can be connected to an external device (e.g., thermostat, controller, 3-speed switch) to control the three fan speeds. The FRBii includes logic to detect when multiple speeds are commanded simultaneously and block all but the highest of the commanded speeds from being sent to the motor windings. A signal to call for electric heat from an external controller will verify that a fan speed is selected before providing the command signal to the external electric heat control to

ensure that electric heat can only be energized when the fan motor is operational. The assembly includes factory provided harnesses to allow for faster installation and improved troubleshooting by the end user.

The FRBii allows for peripheral devices (e.g., thermostat controllers, electric heat relays, water valve actuators, condensate drain pan float switches, air dampers) to be connected by either the OEM or by the installer. The fan relay board also includes a fuse on the secondary side of the transformer to protect against incorrect wiring of external components, shorting the transformer leads.

The signals in the screw terminal block (TB1) and 18-pin black connector (J1) have a nominal voltage of 24VAC. These signals are properly insulated from line voltage present on the assembly (J2-J5).

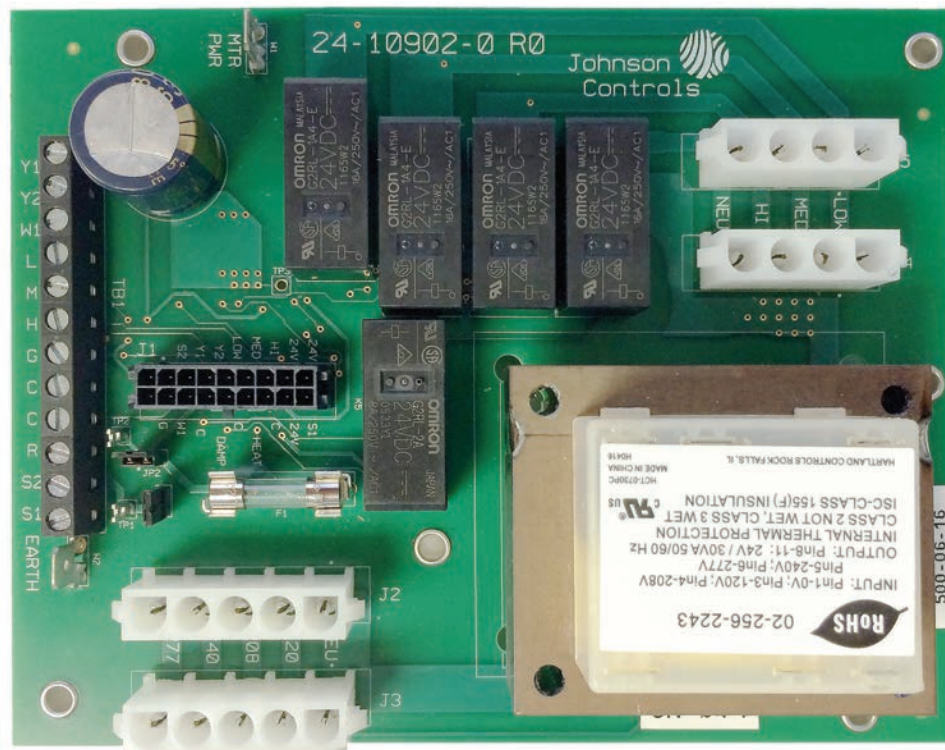


Figure F.1: Fan Relay Board (FRBii)

INSTALLATION

MOUNTING

Important: Do not overtighten the screws. Overtightening may strip the threads and will void the warranty.

Using #8-3/4" screws (quantity six), install the assembly using the provided standoffs.



Risk of Electric Shock

Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

WIRING

Install the wiring so it does not cause a hazard, and is protected against electrical and mechanical damage. .



Risk of electric shock

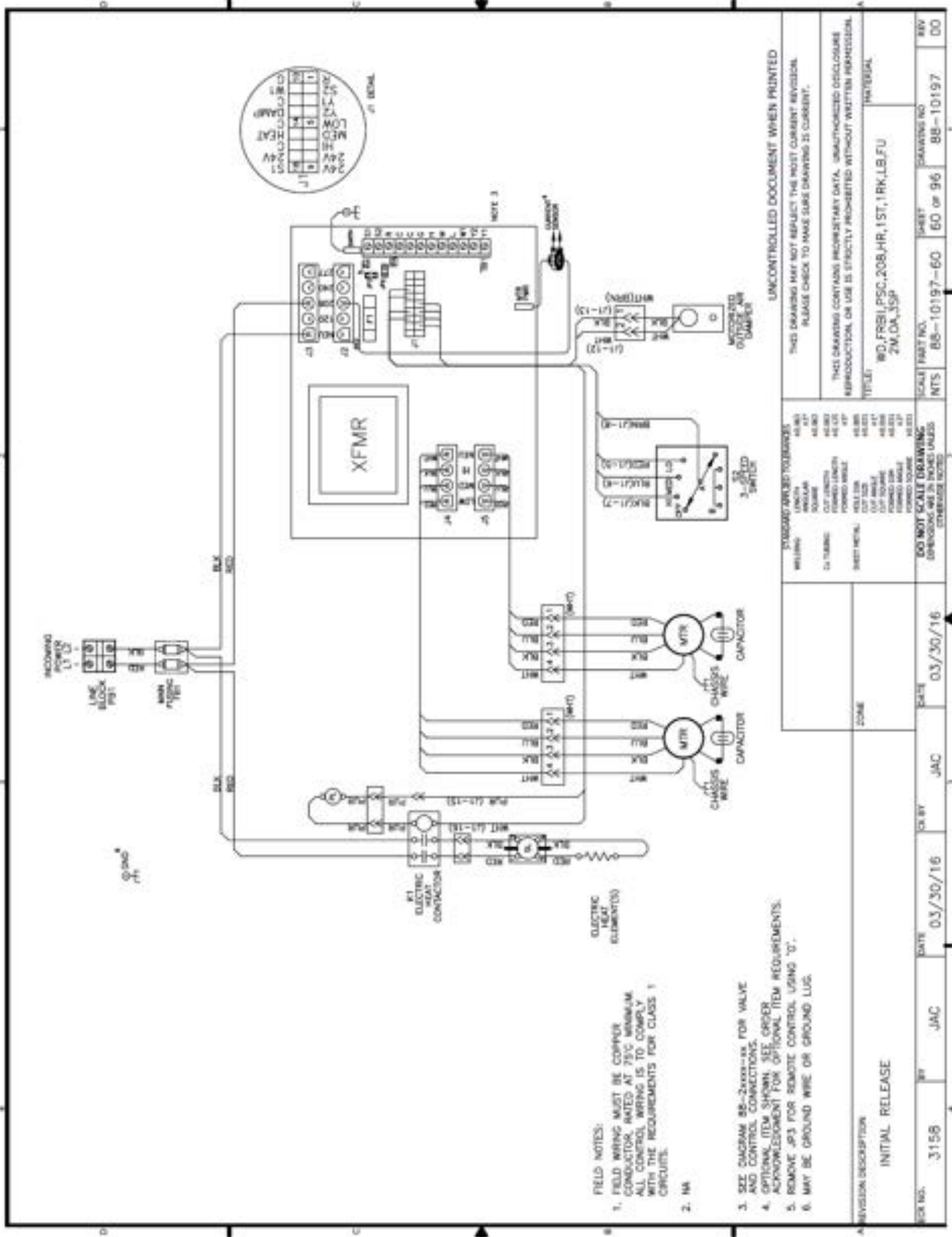
Ground the FRBii according to local, national, and regional regulations. Failure to ground the FRBii may result in electric shock and severe personal injury or death.

Ground the assembly from the EARTH terminal (W2) to the enclosure.

Ratings

Model(s)	30VA – PC-01-0134 PK-FCU030-0 (25-3043-7)
	50VA – PC-01-0135 PK-FCU050-0 (25-3043-15)
Voltage	120 through 277VAC
Current (fan relays)	12A
Operating temperature	-4°F to 140°F (-20°C to 60°C)

REFERENCE WIRE DIAGRAM



- FIELD NOTES:
1. FIELD WIRING MUST BE COPPER CONDUCTOR RATED AT 75°C MINIMUM. ALL CONTROL WIRING IS TO COMPLY WITH THE REQUIREMENTS FOR CLASS 1 CIRCUITS.
 2. NA
 3. SEE DIAGRAM 88-2008-60 FOR VALVE AND CONTROL CONNECTIONS.
 4. OPTIONAL ITEM SHOWN. SEE ORDER ACKNOWLEDGMENT FOR OPTIONAL ITEM REQUIREMENTS.
 5. REMOVE JPS FOR REMOTE CONTROL USING 'D'.
 6. MAY BE GROUND WIRE OR GROUND LUG.

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TITLE: 88-10197-60

REV	NO	DATE	BY	DESCRIPTION
DO	88-10197	60	JAC	INITIAL RELEASE

STANDARD SYMBOLS TO BE USED	44 001
WELDED	44 002
4x TUBING	44 003
OUT LINES	44 004
FORMED METAL	44 005
FORMED METAL	44 006
FORMED METAL	44 007
FORMED METAL	44 008
FORMED METAL	44 009
FORMED METAL	44 010
FORMED METAL	44 011
FORMED METAL	44 012
FORMED METAL	44 013
FORMED METAL	44 014
FORMED METAL	44 015
FORMED METAL	44 016
FORMED METAL	44 017
FORMED METAL	44 018
FORMED METAL	44 019
FORMED METAL	44 020

DO NOT SCALE DRAWING	44 021
CONNECTIONS ARE IN PINKS UNLESS OTHERWISE NOTED	44 022

SCALE	03/30/16
DATE	03/30/16
BY	JAC
NO	3156

REVISION DESCRIPTION	INITIAL RELEASE
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FRBii INPUTS AND OUTPUTS

TB1 – Low Voltage Peripheral Devices

TABLE F.1 – SCREW TERMINAL (TB1) SIGNAL IDENTIFICATION

(see Table F.9 for detailed description of each signal)

Pin	Signal
1	Y1 – Cool 1
2	Y2 – Cool 2
3	W1 – Heat 1
4	L – Low
5	M – Medium
6	H - High
7	G – Fan Enable
8	C – Common (through JP2)
9	C – Common (through JP2)
10	R – 24VAC
11	S2 – Auxiliary Input (Heat 2)
12	S1 – Common

J1 – Low Voltage Peripheral Devices

TABLE F.2 – LOW VOLTAGE PERIPHERAL DEVICE (J1) SIGNAL IDENTIFICATION

Pin	Signal
1	R – 24VAC
2	S2 – Aux In (Heat 2)
3	Y1 – Cool 1
4	Y2 – Cool 2
5	LOW
6	MED
7	HIGH
8	24V
9	24V
10	G – Fan Enable
11	W1 – Heat 1
12	COM
13	DAMP - Damper
14	COM
15	HEAT – Heat output
16	COM
17	24V
18	S1 – Common

J2/J3 – Incoming Power

TABLE F.3 – INCOMING POWER (J2 & J3) SIGNAL IDENTIFICATION

Pin	Signal
1	NEUT
2	120
3	208
4	240
5	277

J4/J5 – Motor Output

TABLE F.4 – MOTOR OUTPUT (J4 & J5) SIGNAL IDENTIFICATION

Pin	Signal
1	LOW
2	MED
3	HIGH
4	NEUT

W1 – MTR PWR

The MTR PWR quick connect provides voltage to the line side of the fan speed relays through an external jumper. For PSC motors, this will be the line voltage of the unit. For EC motors, this will either be 24VAC (without PWM) or a switch contact common (with PWM).

W2 – EARTH

EARTH connection grounds the secondary side of the transformer to the enclosure cabinet through a wire bonded to the control enclosure.

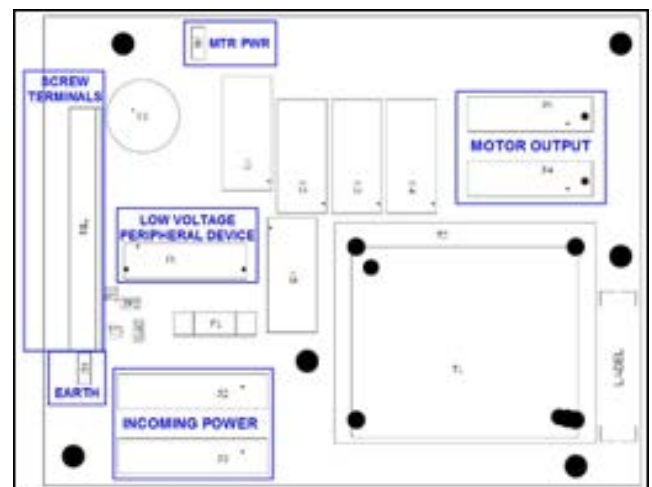


Figure F.2 – Connector layout

Tools needed for installation/troubleshooting:

- Digital multimeter capable of measuring 30 volts AC
- Insulated 1/8" flat bladed screwdriver
- Fuse puller (optional)
- Mini hook test clips for multimeter (optional)

Fuse: A fuse is included on the secondary side of the transformer to protect the transformer from incorrect wiring of thermostat, controller, etc. that shorts the 24VAC and COM. The fuse is a fast-acting glass body cylindrical fuse (5x20mm). If tripped, replace the fuse by removing the tripped fuse with fuse pullers and replace using one of the below listed fuses.

Suggested fuse replacement information:

TABLE F.5 – REPLACEMENT FUSE

Transformer	Fuse	Part Number	Manufacturer	Part Number
30VA	2A	PE-06-0000	Littelfuse	0235002.MXP
			Bussmann	BK/GMA-2-R
50VA	3A	PE-06-0016	Littelfuse	0235003.MXP
			Bussmann	BK/GMA-3-R

HEAT Output – The HEAT output connects to an electric heat contactor or relay. This output represents the command signal from the thermostat or controller on the W1 input. The output is interlocked with the fan relays to ensure that a fan speed is commanded when electric heat is requested.

DAMP Output – The DAMP output connects to a motorized damper actuator used to control airflow from an external source. This output provides 24VAC to energize the damper actuator. This output is interlocked with the fan relays to ensure that a fan speed is commanded before energizing the damper actuator.

TABLE F.6 – FIELD INSTALLED COMPONENT DESCRIPTIONS

Name	Description
Field-provided Float Switch	To install a float switch, wire the float switch leads into S1 and C on the screw terminals. After wiring the float switch, remove jumper JP2. The JP2 jumper must be removed for the float switch to operate correctly. <i>Note: If a float switch was installed in the factory, the float switch may be connected through a factory-provided harnesses instead of wired to the screw terminal.</i>
Start/Stop for the fan	To start or stop the fan from an external controller, wire the leads for the switch contacts that will be made or broken to R and G on the screw terminals. After wiring the switch, remove jumper JP3.
Remote 3-speed switch	To add a remote 3-speed switch, wire the leads for the switch to G, H, M and L on the screw terminals. After wiring the switch, remove jumper JP1.

JUMPERS

TABLE F.7 – JUMPER DESCRIPTION

Jumper	Name	Description
JP1	Speed Select Jumper	This jumper is installed between 24V and HIGH when no three speed switch is included (remote or unit mounted). The jumper will be installed at the end of the harness connected to J1. If a three speed switch is added later, JP1 must be removed.
JP2	Float Switch Jumper	This jumper is installed between S1 and C when a float switch is not installed. The jumper is removed when a float switch is installed.
JP3	Fan Enable Jumper	This jumper is installed between R and G/24V. The jumper is removed when remote control of the fan motor is desired. In most instances, JP3 will be installed (unless a thermostat or controller is remotely controlling of the equipment).

JP2 and JP3 locations can be seen in Figure F.3.

TEST POINTS

TABLE F.8 – TEST POINT DESCRIPTION

Test Point	Name	Description
TP1	24VAC	These test points can be used to verify 24VAC assuming incoming voltage is within tolerance. They can be connected to with mini-hook test clips for a digital multimeter. Test point locations for TP1 and TP2 can be seen in Figure F.3.
TP2	COM	

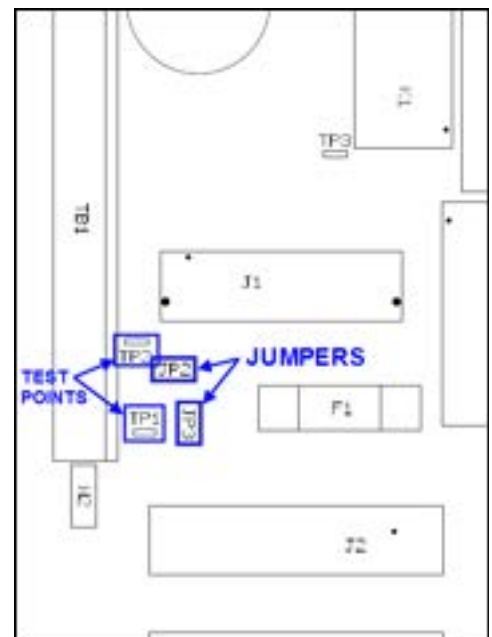
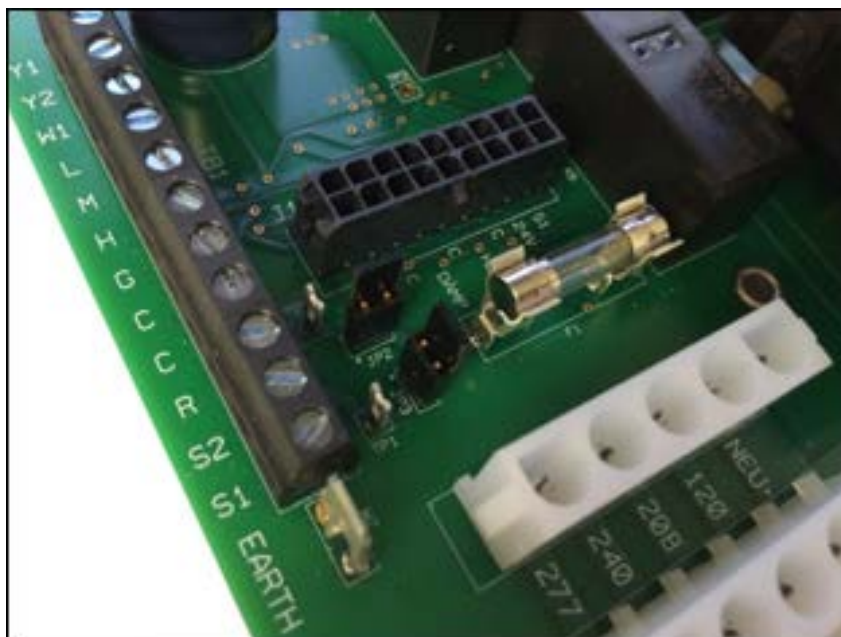


Figure F.3: FRBii Jumpers and Test Points

Screw Terminal Signals:

TABLE F.9 – SCREW TERMINAL SIGNAL IDENTIFICATION

Pin	Signal	Signal Name	Description
1	Y1	Cool 1	Chilled water valve actuator control input, and thermostat cooling output.
2	Y2	Cool 2	“Close” input of modulating chilled water valve actuator or 2nd stage chilled water valve actuator control input, and thermostat cooling output. Y1 is “Open” output if floating {tristate} chilled water valve actuator is installed.
3	W1	Heat 1	Wire connection point for hot water valve actuator or 1st stage EH control input, and thermostat heating output.
4	L	Low	Low speed control input for onboard relay.
5	M	Medium	Medium speed control for onboard relay.
6	H	High	High speed control input for onboard relay.
7	G	Fan Enable	Used to allow external start-stop control from an external source.
8	C	Common (through JP2)	Device common, including onboard speed relays (all terminals C and “COM” on board are internally connected).
9	C		
10	R	24VAC	Transformer “hot” connection (24VAC).
11	S2	Auxiliary Input (Heat 2)	Used for different functions based on application, such as: <ul style="list-style-type: none"> • 2nd stage heat control for two stage EH applications • Changeover water valve/aquastat for two pipe changeover applications. • “Close” input of modulating hot water valve actuator and “Close” output of thermostat in floating [tristate] water valve applications.
12	S1	Common	Common side of transformer. Jumped to C (common) through JP2. If application calls for float switch JP2 is removed and float switch is connected between S1 and C.

Direct Drive Blower Coil Guide Specifications

GENERAL

Furnish and install Johnson Controls, Inc. Model AHD & AVD Blower Coil Units where indicated on the plans and specifications. Units shall be completely factory assembled and tested and shipped as one piece except where noted.

All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions for each model and size shall be considered maximums.

All units shall be of “draw-thru” design with coils, fans, motor, and drain pan completely contained within the unit cabinet.

Units shall be cETL listed in compliance with UL/ANSI Std. 1995.

All unit coils shall meet or exceed the scheduled cooling and heating capacity, selected and rated in accordance with AHRI 410.

CONSTRUCTION

All units shall be fabricated of minimum 18 gauge galvanized steel, able to withstand a 125 hour salt spray test per ASTM B-117. Panels shall be die-formed “multibend” construction for optimum strength and rigidity.

All exterior panels shall be single wall insulated with 1 inch thick fiberglass insulation, rated for a maximum air velocity of 5000 f.p.m.

Optional: Single wall with 1” thick closed cell foam insulation.

Insulation must meet all requirements of ASTM C1071 (including C665), UL181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL723 and NFPA 90A. In addition to using adhesive complying with NFPA 90A, the insulation shall incorporate a secondary mechanical fastener attached to the unit casing wall. Adhesive as the only method of fastening the insulation to the casing is not acceptable.

All access panels shall be fully insulated and attached with standard fasteners on at least two opposite sides. No single access panel shall be larger than 30” x 36” for safety and ease of handling. No coil or drain piping or electrical connections shall pass through any access panel.

Each unit shall be furnished with a one-piece heavy gauge G90 steel or optional IAQ stainless steel drain pan with welded corner construction. Drain pan shall be insulated with minimum 1/8” closed cell foam. All units shall be provided with 9/16” diameter hanger rod holes in the top and bottom panels for “through-bolt” type suspension installation.

Optional: Spring type unit mounting vibration isolators shall be provided by the unit manufacturer.

Optional: Rubber-in-shear type unit mounting vibration isolators shall be provided by the unit manufacturer.

Optional: Units to have factory assembled and installed dbase rails with rigging slots.

All units shall have a minimum 1” duct collar on both the discharge and return.

FAN & MOTOR ASSEMBLY

All units shall be furnished with double inlet forward curved centrifugal blowers statically and dynamically balanced for smooth operation. Blower wheels shall be mounted directly on the motor shaft. Belt driven blowers are not acceptable.

Fan motors shall be electronically commutated with thermal overload protection and a constant torque operation. RPM control shall not be acceptable. Motors shall feature permanently lubricated ball bearings and operate on three or single phase power.

Direct Drive Blower Coil Guide Specifications

All motors to be installed, factory programmed and wired to the control panel.

All motors shall be isolated, depending on motor size, via belly band or torsion flex mount to the blower housing.

All motor wiring is to be terminated in a junction box, external to the unit casing.

All motors to be operated by single-speed or multi-speed local or remote controller.

COILS

All unit coils shall be rated in accordance with AHRI 410.

All coils shall be 1/2" O.D. seamless copper tubes with collared aluminum fins. All tubes shall be mechanically expanded to provide an efficient bond between tube and fin. All water coils shall be provided with a manual air vent fitting to allow for coil venting. Valve core type vent fittings shall not be accepted.

All chilled water, hot water, and direct expansion (DX) coils shall have aluminum fins and 0.016" tube wall thickness.

All coils shall be hydrostatically tested with air under water at 450 PSIG minimum pressure and rated for a maximum of 450 PSIG working pressure at 200°F.

FILTER RACK ASSEMBLY

All units shall be furnished with a flat filter rack with hinged access on both sides designed to accept a 2" nominal standard sized filters. All units shall be provided with nominal 2" throwaway filters factory installed. One complete set of spare throwaway filters shall be provided for each unit.

ELECTRICAL CONTROL

The unit fan motor shall be completely factory wired to an external electrical enclosure. Each unit shall include fan control package with 24 volt control voltage. Each unit shall include a motor control board, motor circuit fusing, control circuit transformer and terminal strip for connection of field wiring.

Calibrated airflow curves shall be provided near the control box to aid in testing and balancing.

A main incoming power non-fused disconnect switch with lock-out-tag-out ready feature shall be factory furnished and wired by the unit manufacturer for single point power connection.

OPTIONS

Piping Packages

Provide a non-insulated, standard factory assembled valve piping package (1/2", 3/4", 1") or piping package parts kit (1 1/4" and 1 1/2") to consist of a 2-way or 3-way, on/off, motorized electric control valve, unions, and two ball isolation valves. Control valves are piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F. Maximum operating pressure shall be 450 PSIG.

Option: Provide 24V floating point modulating control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package (1/2", 3/4", 1") or piping package parts kit (1 1/4" and 1 1/2" sizes).

Option: Provide 0-10V proportional control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package (1/2", 3/4", 1") or piping package parts kit (1 1/4" and 1 1/2" sizes).

Option: Provide either a fixed or adjustable flow control device for each piping package.

Option: Normally Open in lieu of Normally Closed on/off valves.

Direct Drive Blower Coil Guide Specifications

Option: Provide y-strainers, and/or pressure-temperature ports for each piping package.

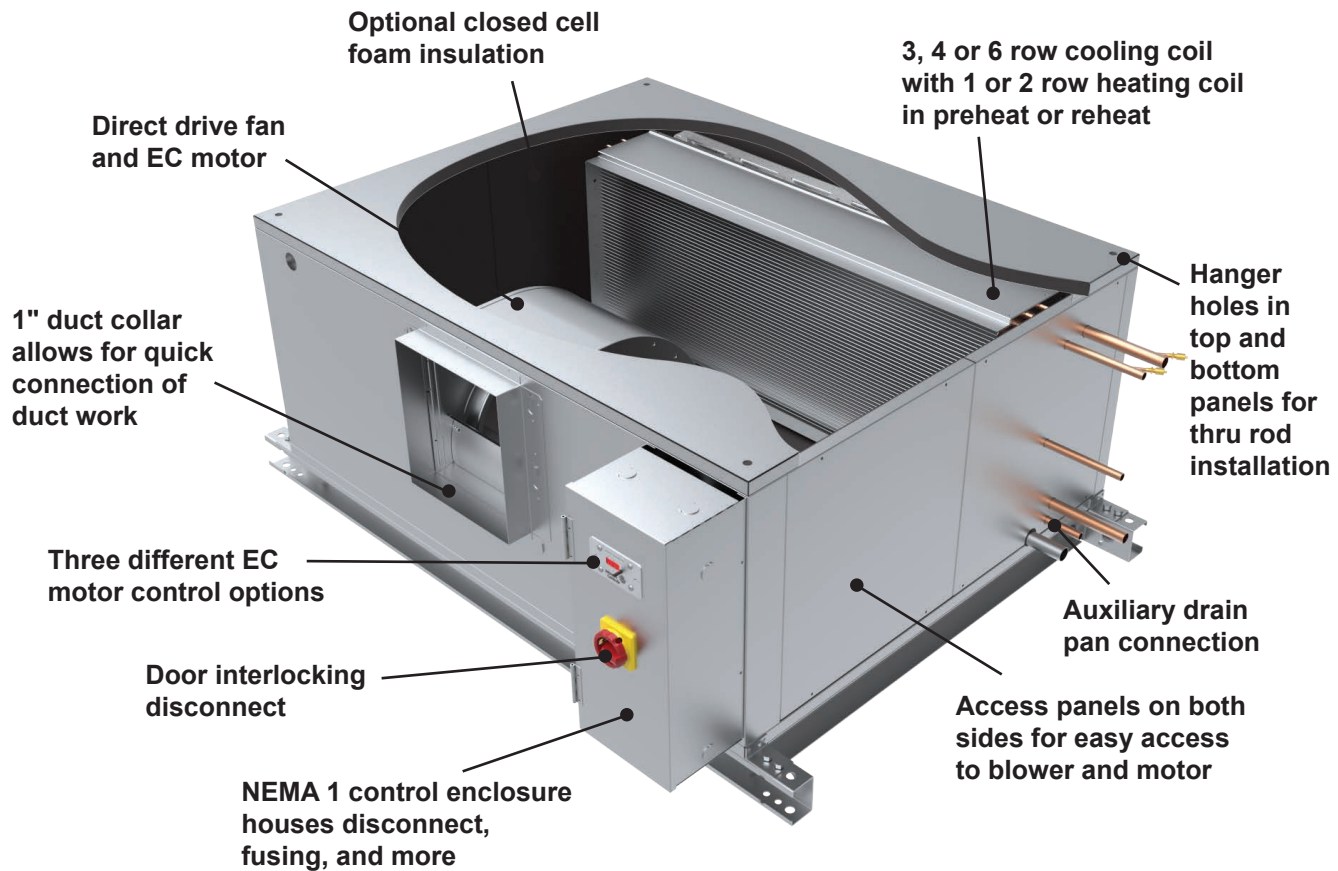
1/2", 3/4", and 1" piping packages shall be completely factory assembled, including interconnecting pipe, and shipped separate from the unit for field installation onto the coil, so as to minimize the risk of freight damage.

1 1/4" and 1 1/2" piping packages shall ship as a parts kit, including instructions, for field assembly and installation.

1 1/4" and 1 1/2" piping packages shall include unions with integrated pressure temperature ports as a standard feature.

SECTION ONE - RECEIPT & INITIAL INSTALLATION

DIRECT DRIVE BLOWER-COIL FEATURES



PREFACE

Johnson Controls direct drive blower-coils represent a prudent investment which can, with proper installation, operation, and regular maintenance, give trouble-free operation and long service.

Your equipment is initially protected under the manufacturer's standard warranty; however, this warranty is provided under the condition that the steps outlined in this manual for initial inspection, proper installation, regular periodic maintenance, and everyday operation of the equipment be followed in detail. This manual should be fully reviewed in advance of any actual work being done on the equipment. Should any questions arise, please contact your local Sales Representative BEFORE proceeding.

The equipment covered by this manual is available with a vast variety of options and accessories. Consult the approved unit submittal, order acknowledgement, and other manuals for details on the options and accessories provided with the equipment on each project.



No attempt should be made to handle, install, or service any unit without following safe practices regarding mechanical equipment.



All power must be disconnected before any installation or service should be attempted. More than one power source may be supplied to a unit. Power to remote mounted control devices may not be supplied through the unit. Never wear bulky or loose fitting clothing when working on any mechanical equipment. Gloves should only be worn when required for proper protection from heat or other possible injury. Safety glasses or goggles should always be worn when drilling, cutting, or working with chemicals such as refrigerants or lubricants.



Never pressurize any equipment beyond specified operating pressures. Always pressure test with some inert fluid or gas such as clear water or dry nitrogen to avoid possible damage or injury in the event of a leak or component failure during testing.



Always protect adjacent flammable material when welding, brazing or soldering. Use suitable heat shield material to contain sparks or drops of solder. Have fire extinguisher available for use when welding or brazing.

The manufacturer assumes no responsibility for personal injury or property damage resulting from improper or unsafe practices during the handling, installation, service, or operation of any equipment.

UNPACKING & INSPECTION

All units are carefully inspected at the factory throughout the manufacturing process under a strict detailed quality assurance program, and where possible, all major components and subassemblies are carefully tested for proper operation and verified to be in full compliance with the factory manufacturing documents. Customer furnished components such as control valves, switches and DDC controls are not factory tested.

Each unit is carefully packaged for shipment to avoid damage during normal transport and handling. The equipment should always be stored in a dry place in the proper orientation as marked on the carton.

All shipments are made F.O.B. factory and it is the responsibility of the receiving party to inspect the equipment upon arrival. Any obvious damage to the carton and/or its contents should be recorded on the bill of lading and a claim should be filed with the freight carrier.

After determining the condition of the carton exterior, carefully remove each unit from the carton and inspect for hidden damage. At this time check to make sure that “furnished only” items such as switches, thermostats, etc., are accounted for. Any hidden damage should be recorded and immediately reported to the carrier and a claim must be filed. In the event a claim for shipping damage

is filed, the unit, shipping carton, and all packing must be retained for physical inspection by the freight carrier. All equipment should be stored in the factory-shipping carton with internal packing in place until installation.

At the time of receipt, the equipment type and arrangement should be verified against the order documents. Should any discrepancy be found, the local Sales Representative should be notified immediately so that the proper action may be instituted. Should any question arise concerning warranty repairs, the factory must be notified BEFORE any corrective action is taken. Where local repairs or alterations can be accomplished, the factory must be fully informed as to the extent and expected cost of those repairs before work is begun. Where factory operations are required, the factory must be contacted for authorization to return equipment and a Return Authorization Number will be issued. Unauthorized return shipments of equipment and shipments not marked with an authorization number will be refused. In addition, the manufacturer will not accept any claims for unauthorized expenses.

CODE COMPLIANCE

This equipment has been manufactured and certified to conform to UL Standard for Heating and Cooling Equipment, UL 1995 (4th Edition) and to CSA Standard C22.2 No. 236. It bears the ETLc listed mark under Intertek Client #41629.

HANDLING AND INSTALLATION

While all equipment is designed for durability and fabricated for sturdy construction and may present a rugged appearance, great care must be taken to assure that no force or pressure be applied to the coil, piping or drain stub-outs during handling. Also, depending on the options and accessories, some units could contain delicate components that may be damaged by improper handling. Wherever possible, all units must be maintained in an upright position and handled by the chassis as close as possible to the mounting point locations.

The equipment covered in this manual IS NOT suitable for outdoor installations. The equipment should never be stored or installed where it may be subjected to a hostile environment such as rain, snow, or extreme temperatures.

During and after installation, special care must be taken to prevent foreign material such as paint, plaster, and drywall dust from being deposited in the drain pan, coil, or on the motor or blower wheels. Failure to do so may have serious adverse effects on unit operation and in the case of the motor and blower assembly, may result in immediate or premature failure. All manufacturers' warranties are void if foreign material is allowed to be deposited on the motor or blower wheels of any unit. Some units and/or job conditions may require some form of temporary covering during construction.

While the manufacturer does not become involved in the design and selection of support methods and components, it should be noted that unacceptable system operating characteristics and/or performance may result from improper or inadequate unit structural support. In addition, adequate clearance must be provided for service and removal of the equipment and its accessory components. Anchoring the equipment in place is accomplished by using the mounting points provided and positioning the unit to maintain the unit on a LEVEL plane. The drain pan is internally sloped toward the outlet connection. Care must be taken to insure that the unit drain pan does not slope away from the outlet connection.



The unit's drain pan is factory sloped towards the drain connection when the unit is installed level and plumb.

UNIT RIGGING AND PLACEMENT

Install ductwork to comply with ASHRAE Fundamentals Handbook, SMACNA, NFPA 90A and local code.

The installation must conform with local building codes and the National Electric Code.

Locate unit support in accordance with the mechanical and structural plans. If so equipped, locate the isolator placement and correct size as shown on the submittal drawing.

Ceiling suspension of horizontal units have factory provisions for thru bolt hanger rods. If floor mount isolators are required for either horizontal or vertical units, then factory or field provisions must be made for isolator attachment. Vertical units can be mounted directly to the floor or on a base rail. For units with isolators but no base rail, 6" legs are required and will need to be mounted to the base of the unit. If a base rail is provided, isolators can be installed in mounting holes provided on this base rail.

Do not handle the unit using coil stubout connectors, as damage may occur at brazed joint(s).

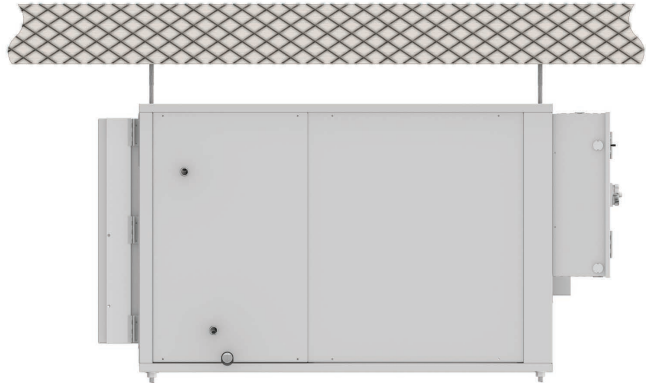


Figure 1a: Side view

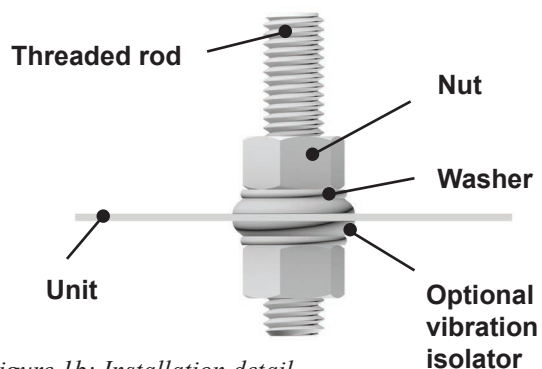


Figure 1b: Installation detail

Figure 1a-1b: Typical ceiling installation

DRAIN PAN

Standard drain pans are constructed of single wall galvanized steel (with an option for stainless steel) and sit on insulation. The drain protrudes from the unit cabinet and can be equipped with a secondary drain connection. See illustration below.

COILS

All blower-coils are available in 2 or 4 pipe configurations. Heating coils are available in reheat or preheat position. Heating and cooling coils are available with right, left or opposite side connections.

Verify that the proper types of service are actually provided to the unit. On units with steam heating coils, the maximum steam pressure applied to the unit should never exceed 15 PSIG. The drain piping and steam trap should be sized and routed to allow for proper condensate flow. The routing and sizing of all piping, and the type and sizing of all wiring and other electrical components such as circuit breakers, disconnect switches, etc., should be determined by the individual job requirements and should not be based on the size and/or type of connection provided on the equipment. All installations should be made in compliance with all governing codes and ordinances. Compliance with all codes is the responsibility of the installing contractor.

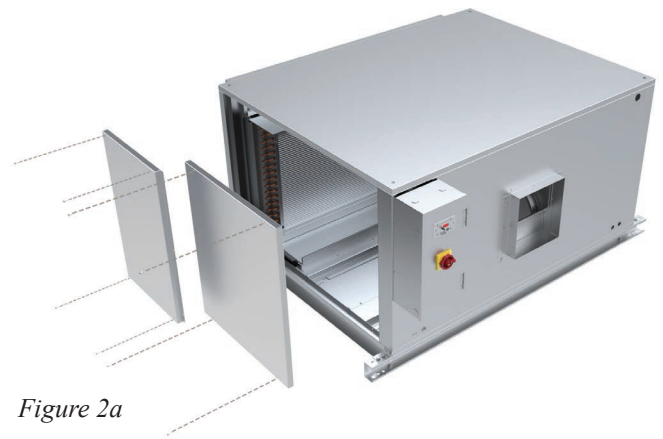


Figure 2a

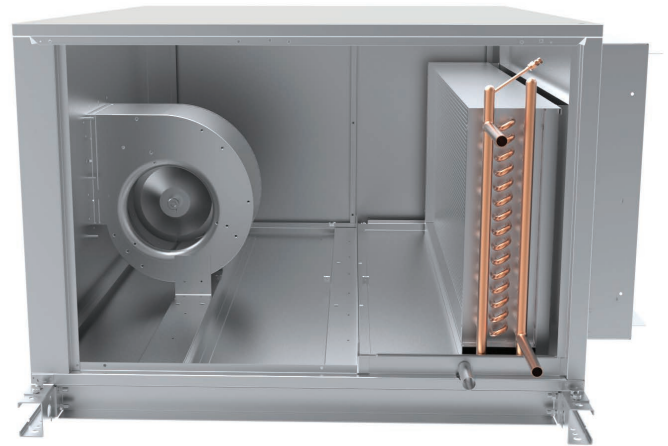


Figure 2b

Figure 2a-2b: Drain pan access

COOLING/HEATING MEDIUM CONNECTIONS



Toxic residues and loose particles resulting from manufacturing and field piping techniques such as joint compounds, soldering flux, and metal shavings may be present in the unit and the piping system. Not for use with domestic or potable water systems.

Submittals and Product Catalogs detailing unit operation, controls, and connections should be thoroughly reviewed BEFORE beginning the connection of the various cooling and/or heating mediums to the unit.

Hot water and cooling coils are male sweat connection. Use appropriate brazing alloy for system temperature and pressure. Refer to equipment construction submittal drawing for specific connection size. **MAXIMUM HYDRONIC SYSTEM OPERATING PRESSURE MUST NOT EXCEED 450 PSIG.**

All factory provided or field provided valve packages are to be installed as required, and all service valves should be checked for proper operation. Refer to the valve component manufacturer's submittals and/or IOM manual for proper installation, troubleshooting, and operational guidance.

Valves and TXVs must be secured and supported to avoid damage to coil headers or distributor tubes. All valves, pipes, and components must be sufficiently supported to ensure structural integrity and proper operation of the unit.



All water coils must be protected from freezing after initial filling with water. Even if the system is drained, unit coils may still hold enough water to cause damage when exposed to temperatures below freezing.

Refrigerant systems should be tested with dry nitrogen rather than air to prevent the introduction of moisture into the system. In the event that leaking or defective components are discovered, the Sales Representative must be notified BEFORE any repairs are attempted. All leaks should be repaired before proceeding with the installation.

After system integrity has been established, the piping should be insulated in accordance with the project specifications. ALL chilled water piping and valves or

refrigerant suction piping not located over drain pans must be insulated to prevent damage from sweating. This includes factory and field piping inside the unit cabinet.

The drain should always be connected and piped to an acceptable disposal point. For proper moisture carry-off, the drain piping should be sloped away from the unit at least 1/8" per foot. A drain trap may be required by local codes and it is strongly recommended for odor containment.

DUCTWORK CONNECTIONS

All ductwork and/or supply and return grilles (provided by others) should be installed in accordance with the project plans and specifications. If not included on the unit or furnished from the factory, Johnson Controls supply and return grilles are available in a variety of types.

Units are configured from the factory with duct collars for attaching ductwork. The factory suggests using galvanized sheet metal ductwork or a flexible canvas attached to the duct collars using sheet metal screws. Duct connections should follow SMACNA standards and national and local codes.

All units must be installed in non-combustible areas. Some models are designed to be connected to duct-work with a MINIMUM amount of external static pressure. Consult the approved submittals and the product catalog for unit external static pressure limitations.

Units provided with outside air for ventilation should have some form of low temperature protection to prevent coil freeze-up.

It should be noted that none of these methods would adequately protect a coil in the event of power failure. The safest method of freeze protection is to use glycol in the proper percent solution for the coldest expected air temperature.

The manufacturer assumes no responsibility for undesirable system operation due to improper design, equipment or component selection, and/or installation of ductwork, grilles, and other field supplied components.

ELECTRICAL CONNECTIONS

The unit nameplate lists the unit electrical characteristics such as the required supply voltage, fan and heater amperage and required circuit ampacities. The unit-wiring diagram shows all unit and field wiring connection points. Since each project is different and each unit on a project may be different, the installer must be familiar with the wiring diagram and nameplate on the unit BEFORE beginning any wiring. This unit is not acceptable for installation in hazardous/explosive areas.

ELECTRICAL ENCLOSURE

The electrical control enclosure provides access to the electrical compartment. This compartment houses all electric heat and control components. Terminals are furnished for simple power and control wiring connections. Multiple knockouts allow wiring entries from either side of the compartment.



Figure 3: Electrical enclosure

All components furnished for field installation, by either the factory or the controls contractor should be located and checked for proper function and compatibility. All internal components should be checked for shipping damage. After installation and before energizing the unit, verify voltage and check that all electrical connections are tight. Electrical connections should be periodically checked for tightness.

Any devices such as fan switches or thermostats that have been furnished from the factory for field installation must be wired in strict accordance with the applicable wiring diagrams. For electrical devices that

are field mounted and provided by others, please refer to the original manufacturer's IOM for proper installation, troubleshooting and operation guidance. Failure to do so could result in personal injury or damage to components and will void all manufacturer's warranties.

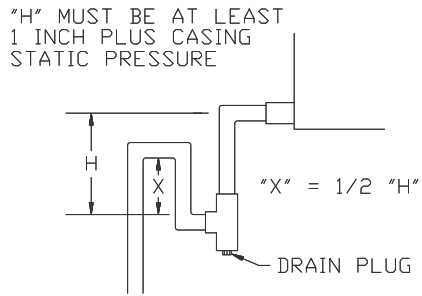
All field wiring should be done in accordance with governing codes and ordinances. Any modification of the unit wiring without factory authorization will result in voiding of all factory warranties and will nullify any agency listings.

The manufacturer assumes no responsibility for any damages and/or injuries resulting from improperly field installed or wired components.

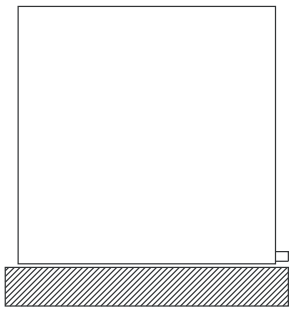
This unit is listed to UL/CSA standards. All modifications to line voltage wiring must be performed in accordance with the NEC and inspected by ETL to maintain product listing. Unauthorized modification to any wiring may impact unit performance and void ETL listing and/or product warranty.

CONDENSATE DRAIN AND TRAPS

Drain lines should be at least the same size as the drain pan connection. Properly sized traps should be used to allow the condensate from the coils to drain from the drain pan. *See Fig. 4.*

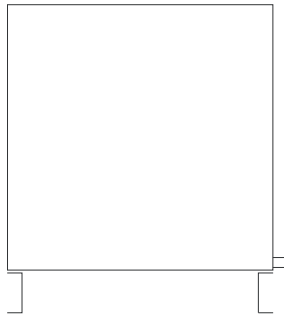


Trap detail for negative cabinet static pressure



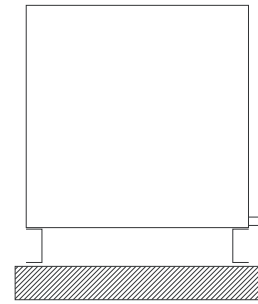
NO BASE RAIL

Housekeeping pad
Required to accommodate
trap height



WITH BASE RAIL

Depending on static
pressure, housekeeping
pad may not be needed
for trap installation



**WITH BASE RAIL AND
HOUSEKEEPING PAD**

LD13929

Figure 4: Condensate drain and traps

PERFORMANCE DATA SHEETS

PERFORMANCE

Performance Data Sheet

Unit Tag FCU-1, FCU-2, FCU-3, FCU-4	Qty 4	Model FNP12	Air Flow 670 CFM	Total Duty 34,615 Btuh	Sensible Duty 19,225 Btuh
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Unit Data

Model Size : 12	(Fans) Speed : (2) Medium	Filter : 2" 30% Pleated (MERV 8)	Coil Tube Dia. [in.] 3/8
Type : Horizontal High Performance	(Motors) HP : (1) 1/2	Filter (Qty) Size : (2) 16x16	Coil Face Area [ft²] 2.82
	Motor FLA : 7.7	Filter Face Area [ft²] 3.23	Weight* [lb] 205
	Motor Type : ECM		
	Capacity : Std. Capacity		

Output Data

Altitude [Ft.]	0
Air Flow Rate [CFM]	670
ESP [in.wg]	0.50
Chilled Water Coil Data	
EAT DB/WB [°F]	77.2/ 68.4
LAT DB/WB [°F]	51.3/ 51.1
Total Capacity [Btuh]	34,615
Sensible Capacity [Btuh]	19,225
EWT/LWT [°F]	44.0/ 55.9
Fluid Flow [gpm]	6.10
Fluid P.D [ft.wg]	5.85
Fluid Velocity [fps]	2.60
Rows / FPI / Circuits	6 Row / 10 FPI / 7 Ckt
Coil Connection Size: [in.]	0.875
Hot Water Coil (Re-Heat) Data	
EAT DB [°F]	52.0
LAT DB [°F]	89.6
Sensible Capacity [Btuh]	29,495
EWT/LWT [°F]	160.0/ 140.1
Fluid Flow [gpm]	2.80
Fluid P.D [ft.wg]	1.66
Fluid Velocity [fps]	2.80
Rows / FPI / Circuits	1 Row / 10 FPI / 3 Ckt
Coil Connection Size: [in.]	0.625

Options

2" 30% Pleated Spare (MERV 8) (2)
BC02 24V, Unit S/S Relay / Fan Op. Relay & Transformer
Coil Casing- Galvanized Casing
Control Enclosure Handling- Opposite of Coil 1
Enclosure Mount- Unit Mounted
Filter Side Access
Foil Faced Insulation
Galvanized Drain pan
Motor Control- 2-10 VDC (Sync)
OC013 Non-Fused Door Interlocking Disconnect Switch - 40 Amps
Rear Return
Thermostat Location- No Thermostat
Thermostat- No Thermostat
Chilled Water Coil: Piping Package Size - 1/2"
Chilled Water Coil:2-Way Control Valve
Chilled Water Coil:Actuator Position- Fail In Place - Proportional
Chilled Water Coil:Auto Air Vent
Chilled Water Coil:Factory Mounted Piping Package
Chilled Water Coil:P/T Ports
Chilled Water Coil:Package Code- Code: 25 (Manual Ball Valve with Memory Stop, Fixed Flow Control) (7.00 GPM)
Chilled Water Coil:Proportional Valves (24v Only)
Chilled Water Coil:Right Hand
Chilled Water Coil:Unions
Chilled Water Coil:Y-Strainer- Y-Strainer with Blowdown
Hot Water Coil: Piping Package Size - 1/2"
Hot Water Coil:2-Way Control Valve
Hot Water Coil:Actuator Position- Fail In Place - Proportional
Hot Water Coil:Auto Air Vent
Hot Water Coil:Factory Mounted Piping Package
Hot Water Coil:P/T Ports
Hot Water Coil:Package Code- Code: 25 (Manual Ball Valve with Memory Stop, Fixed Flow Control) (3.00 GPM)
Hot Water Coil:Proportional Valves (24v Only)
Hot Water Coil:Right Hand
Hot Water Coil:Unions
Hot Water Coil:Y-Strainer- Y-Strainer with Blowdown

Special Quote (SQ)#	Special Quote (SQ)#	Special Quote (SQ)#	Special Quote (SQ)#
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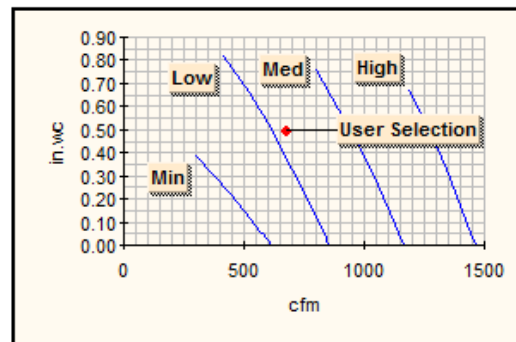
Electrical Data

Motor Voltage [V/P/HZ]	115/1/60 ECM
Total Full Load Amps :	7.70
MCA / MSCP :	9.63 / 15.00
Fan Power Input [Watts@CFM]	211.00
3-Phase Neutral Amps [Amps]	13.30

Sound Data Calculated at 670 CFM and 1040 RPM

	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Ducted Discharge	68	64	63	62	59	55	43
Casing Radiated Free Inlet	70	65	65	64	59	55	48

- * Unit weight includes unit with wet coil(s) as selected.
 - Does not include accessories
- Unit pressure drop and air flow based upon dry coil as required by AHRI-440.
- Sound data tested in accordance with AHRI-260-2012
- Sound Data Calculated at 670 CFM and 1040 RPM
- Scheduled motor information is for Fan Input Power at High Speed.
- For 0' altitude the coil selection has been made at Standard Conditions.



Performance Data Sheet

Unit Tag FCU-5	Qty 1	Model FNP20	Air Flow 1275 CFM	Total Duty 49,163 Btuh	Sensible Duty 33,523 Btuh
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Unit Data

Model Size : 20	(Fans) Speed : (2) Medium	Filter : 2" 30% Pleated (MERV 8)	Coil Tube Dia. [in.] 3/8
Type : Horizontal High Performance	(Motors) HP : (2) 1/2	Filter (Qty) Size : (2) 16x25	Coil Face Area [ft²] 4.67
	Motor FLA : 13	Filter Face Area [ft²] 5.14	Weight* [lb] 270
	Motor Type : ECM		
	Capacity : Std. Capacity		

Output Data

Altitude [Ft.]	0
Air Flow Rate [CFM]	1275
ESP [in.wg]	0.75
Chilled Water Coil Data	
EAT DB/WB [°F]	75.9/ 64.9
LAT DB/WB [°F]	52.0/ 51.6
Total Capacity [Btuh]	49,163
Sensible Capacity [Btuh]	33,523
EWT/LWT [°F]	44.0/ 56.1
Fluid Flow [gpm]	8.40
Fluid P.D [ft.wg]	4.93
Fluid Velocity [fps]	2.50
Rows / FPI / Circuits	6 Row / 10 FPI / 10 Ckt
Coil Connection Size: [in.]	1.125
Hot Water Coil (Re-Heat) Data	
EAT DB [°F]	52.0
LAT DB [°F]	92.5
Sensible Capacity [Btuh]	57,367
EWT/LWT [°F]	160.0/ 140.0
Fluid Flow [gpm]	5.70
Fluid P.D [ft.wg]	1.05
Fluid Velocity [fps]	2.40
Rows / FPI / Circuits	1 Row / 10 FPI / 7 Ckt
Coil Connection Size: [in.]	0.875

Options

- 2" 30% Pleated Spare (MERV 8) (2)
- BC02 24V, Unit S/S Relay / Fan Op. Relay & Transformer
- Coil Casing- Galvanized Casing
- Control Enclosure Handing- Opposite of Coil 1
- Enclosure Mount- Unit Mounted
- Filter Side Access
- Foil Faced Insulation
- Galvanized Drain pan
- Motor Control- 2-10 VDC (Sync)
- OC013 Non-Fused Door Interlocking Disconnect Switch - 40 Amps
- Rear Return
- Thermostat Location- No Thermostat
- Thermostat- No Thermostat
- Chilled Water Coil: Piping Package Size - 1/2"
- Chilled Water Coil:2-Way Control Valve
- Chilled Water Coil:Actuator Position- Fail In Place - Proportional
- Chilled Water Coil:Auto Air Vent
- Chilled Water Coil:Factory Mounted Piping Package
- Chilled Water Coil:Left Hand
- Chilled Water Coil:P/T Ports
- Chilled Water Coil:Package Code- Code: 25 (Manual Ball Valve with Memory Stop, Fixed Flow Control) (9.00 GPM)
- Chilled Water Coil:Proportional Valves (24v Only)
- Chilled Water Coil:Unions
- Chilled Water Coil:Y-Strainer- Y-Strainer with Blowdown
- Hot Water Coil: Piping Package Size - 1/2"
- Hot Water Coil:2-Way Control Valve
- Hot Water Coil:Actuator Position- Fail In Place - Proportional
- Hot Water Coil:Auto Air Vent
- Hot Water Coil:Factory Mounted Piping Package
- Hot Water Coil:Left Hand
- Hot Water Coil:P/T Ports
- Hot Water Coil:Package Code- Code: 25 (Manual Ball Valve with Memory Stop, Fixed Flow Control) (6.00 GPM)
- Hot Water Coil:Proportional Valves (24v Only)
- Hot Water Coil:Unions
- Hot Water Coil:Y-Strainer- Y-Strainer with Blowdown

Special Quote (SQ)#	Special Quote (SQ)#	Special Quote (SQ)#	Special Quote (SQ)#
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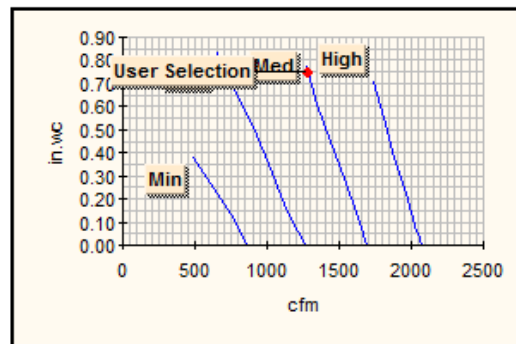
Electrical Data

Motor Voltage [V/P/HZ]	115/1/60 ECM
Total Full Load Amps	13.00
MCA / MSCP	14.63 / 20.00
Fan Power Input [Watts@CFM]	454.00
3-Phase Neutral Amps [Amps]	22.50

Sound Data Calculated at 1275 CFM and 1223 RPM

	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Ducted Discharge	72	68	67	69	65	62	53
Casing Radiated Free Inlet	71	68	68	70	65	62	58

- * Unit weight includes unit with wet coil(s) as selected.
 - Does not include accessories
- Unit pressure drop and air flow based upon dry coil as required by AHRI-440.
- Sound data tested in accordance with AHRI-260-2012
- Sound Data Calculated at 1275 CFM and 1223 RPM
- Scheduled motor information is for Fan Input Power at High Speed.
- For 0' altitude the coil selection has been made at Standard Conditions.



Performance Data Sheet

Unit Tag FCU-6	Qty 1	Model AHD20	Air Flow 2065 CFM	Total Duty 58.7 MBH	Sensible Duty 47.5 MBH	Weight 378 lb
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Unit Data

Model Size : 20	Motor Qty : 1	Filter : 2" 30% Pleated (MERV 8)	Coil Tube Dia. [in.] 0.52
Type : Direct Drive Blower Coils	Motor FLA : 12.80	Filter (Qty) Size : (1) 16x20x2, (1) 16x25x2	Tube Wall [in.] 0.016
Motor Type : Direct Drive ECM	Fan Amps@CFM : 5.62	Filter Face Area [ft²] 5.0	Coil Face Area [ft²] 4.9
Motor HP : 1	Fan RPM@CFM : 1340		

Output Data

Altitude [Ft.]	0
Air Flow Rate [CFM]	2065
ESP [in.wg]	0.75
TSP [in.wg]	1.57

Chilled Water Coil Data

EAT DB/WB [°F]	74.4/ 62.7
LAT DB/WB [°F]	53.6/ 52.9
Total Capacity [MBH]	58.7
Sensible Capacity [MBH]	47.5
EWT/LWT [°F]	44.0/ 55.9
Fluid Flow [gpm]	9.80
Fluid P.D [ft.wg]	1.94
Fluid Velocity [fps]	1.70
Rows / FPI / Circuits	6 Row/ 12 FPI / 10 Ckt
Coil Connection Size: [in.]	1.125

Hot Water Coil (Re-Heat) Data

EAT DB [°F]	54.0
LAT DB [°F]	83.7
Sensible Capacity [MBH]	66.5
EWT/LWT [°F]	160.0/140.6
Fluid Flow [gpm]	7.00
Fluid P.D [ft.wg]	11.72
Fluid Velocity [fps]	6.00
Rows / FPI / Circuits	1 Row/ 12 FPI / 2 Ckt
Coil Connection Size: [in.]	0.625

Options

- Access Door- Standard
- Control Enclosure Location- Alternate 2
- Disconnect Switch- Door Interlock Disconnect Switch (40 Amp Non-Fused)
- Drain Pan Handing- Right Hand
- Drain Pan Material- IAQ Galvanized
- Filter Type- 2" 30% Pleated (MERV 8)
- Inlet Option- None
- Insulation Type- Foil Faced Fiberglass
- Motor Control- Sync (Remote Signal Adj 2-10VDC)
- Motor Handing- Right Hand
- Motor Type- Direct Drive ECM
- Spare 2" Filter- 2" 30% Pleated Spare (MERV 8) (2)
- Speed Switch- None
- Unit Arrangement- Fan Arr. 3 (Horiz. Top Front)
- Chilled Water Coil:Coil Casing Material- Galvanized
- Chilled Water Coil:Coil Handing- Right Hand
- Chilled Water Coil:Tube Wall- 0.016 in.
- Hot Water Coil:Coil Casing Material- Galvanized
- Hot Water Coil:Coil Handing- Right Hand
- Hot Water Coil:Tube Wall- 0.016 in.

Special Quote (SQ)#	Special Quote (SQ)#	Special Quote (SQ)#
Special Quote (SQ)#	Special Quote (SQ)#	Special Quote (SQ)#

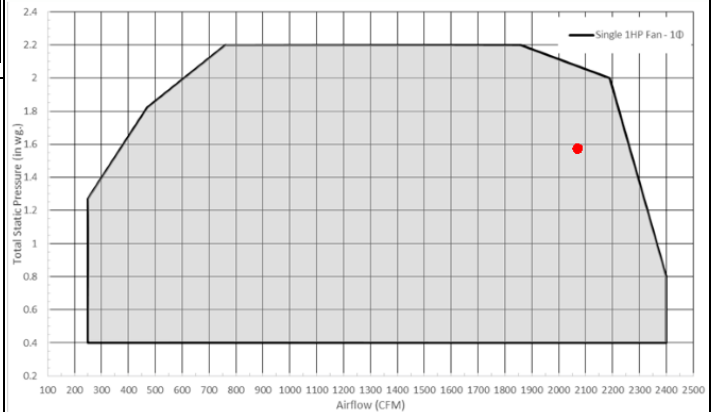
Electrical Data

V/P/HZ	: 115/1/60 ECM
Total Full Load Amps	: 12.80
MCA / MSCP	: 16.00 / 25.00
Fan Power Input [Watts@CFM]	1047

- Unit weight includes unit wet coil(s) as selected.
- Coils are manufactured in accordance with AHRI-410.

Sound Data Calculated at 2065 CFM, 1.57 in.wg, and 1340 RPM

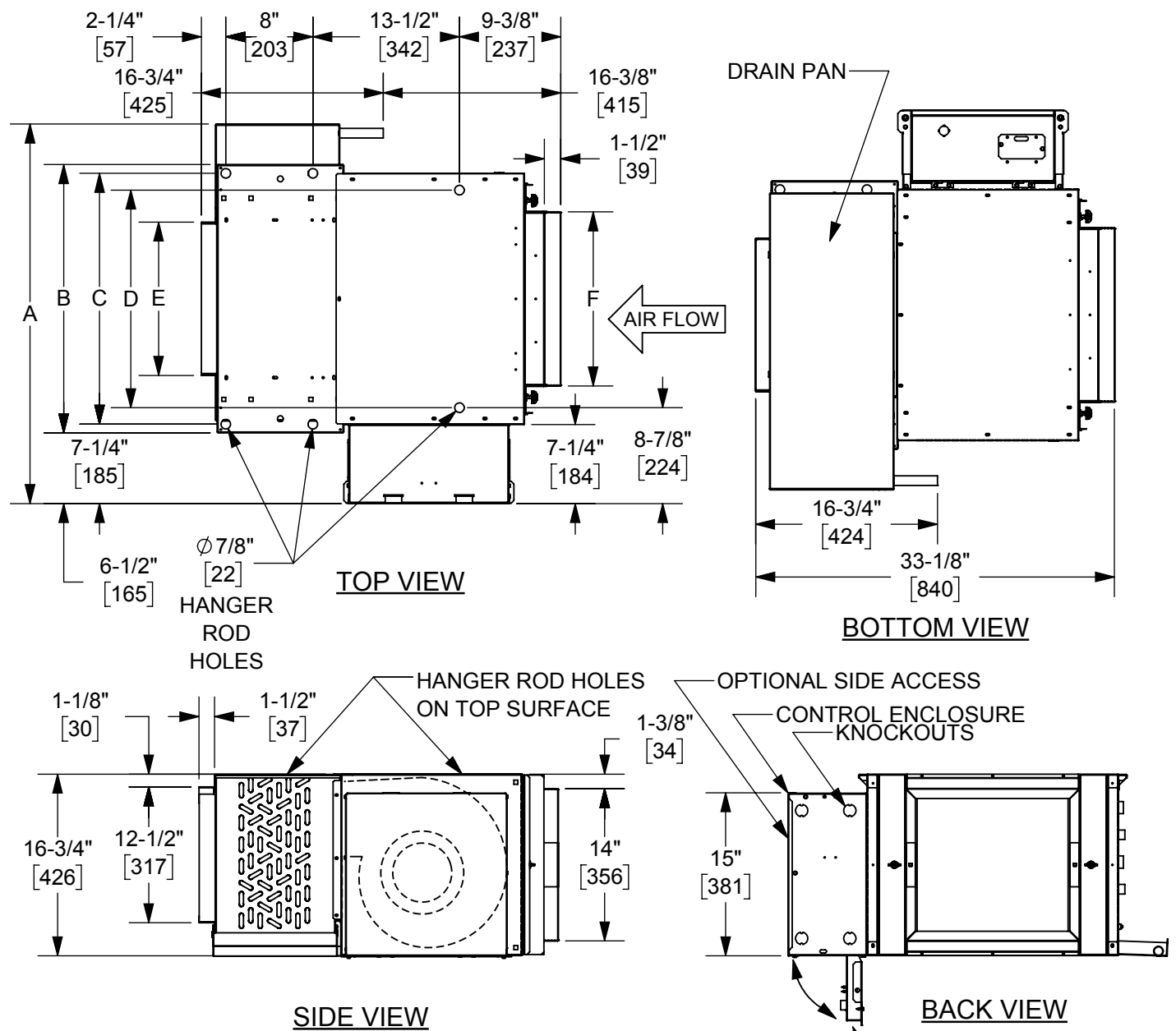
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Ducted Discharge	81	86	78	74	76	71	72	68
Casing Rad. Free Inlet	70	69	67	60	60	57	53	46



Unit Operating Conditions						
Unit Size	Fan Size	Airflow		Mechanical		
		CFM	TSP	RPM	HP	QTY
20	10-08	2065	1.57	1340	1	1

DRAWINGS

DRAWINGS



CONTROL ENCLOSURE
BOTTOM ACCESS DOOR
(OPEN POSITION)

- NOTES:**
1. All dimensions in Inches [millimeters]. All dimensions $\pm 1/4"$ [6mm]. Metric values are soft conversion.
 2. Right hand unit shown, Left hand unit opposite.
 3. Standard control enclosure is mounted on unit side opposite cooling coil connections and includes (4) knockouts on (2) sides. Provide sufficient clearance to access electrical controls and comply with applicable codes and ordinances.

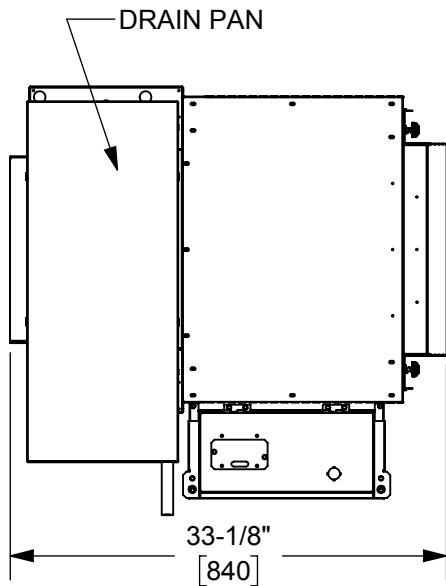
DIMENSIONS						
UNIT SIZE	A	B	C	D	E	F
06	34-7/8" [886]	24-3/4" [629]	23-1/8" [587]	20" [508]	14" [356]	16" [406]
08	39-7/8" [1013]	29-3/4" [756]	28-1/8" [714]	25" [635]	19" [483]	20" [508]
10	43-7/8" [1114]	33-3/4" [858]	32-1/8" [816]	29" [737]	23" [584]	25" [635]
12	48-7/8" [1241]	38-3/4" [985]	37-1/8" [943]	34" [864]	28" [711]	32" [813]
14	53-7/8" [1368]	43-3/4" [1112]	42-1/8" [1070]	39" [991]	33" [838]	36" [915]
16	58-7/8" [1495]	48-3/4" [1239]	47-1/8" [1197]	44" [1118]	38" [965]	40" [1016]
18	63-7/8" [1622]	53-3/4" [1366]	52-1/8" [1324]	49" [1245]	43" [1092]	45" [1143]
20	67-7/8" [1724]	57-3/4" [1467]	56-1/8" [1426]	53" [1346]	47" [1194]	50" [1270]

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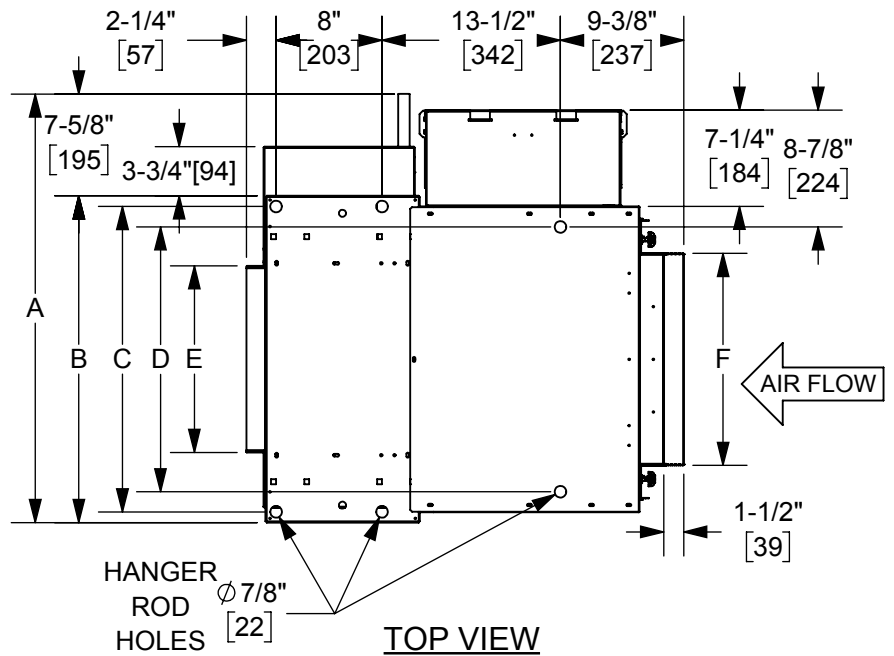


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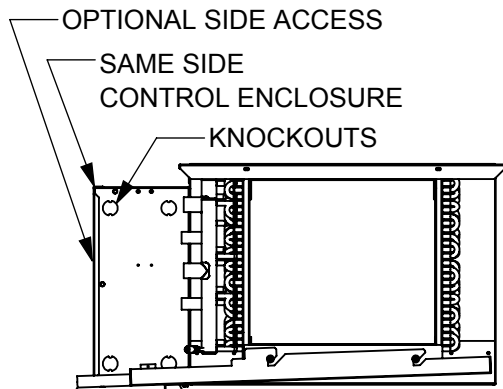
SUBMITTAL DRAWING ALL DRAWINGS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE DO NOT SCALE DRAWING DIMENSIONS ARE IN INCH (MM) FORMAT +/- 1/8 (3) UNLESS OTHERWISE NOTED	TITLE: MODEL FNP 2-PIPE OR 4-PIPE W/O ELECTRIC HEAT	
	DATE: 4/15/2020	SHEET: PAGE 1 OF 2
DRAWING NO: 82-80036-J	REV: B	



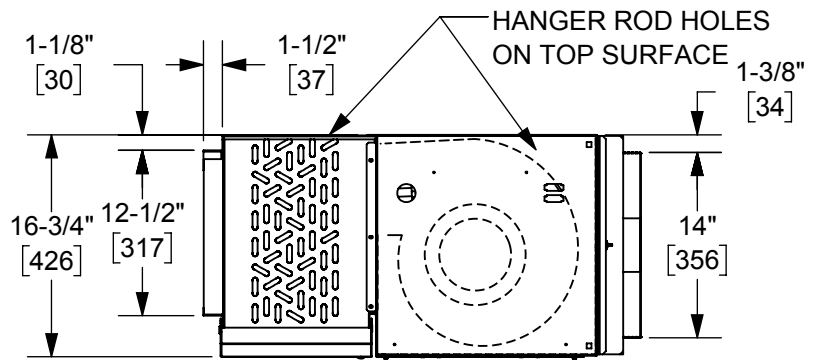
BOTTOM VIEW



TOP VIEW



FRONT VIEW



SIDE VIEW

DIMENSIONS

UNIT SIZE	A	B	C	D	E	F
06	32-3/8" [822]	24-3/4" [629]	23-1/8" [587]	20" [508]	14" [356]	16" [406]
08	37-3/8" [949]	29-3/4" [756]	28-1/8" [714]	25" [635]	19" [483]	20" [508]
10	41-3/8" [1050]	33-3/4" [858]	32-1/8" [816]	29" [737]	23" [584]	25" [635]
12	46-3/8" [1177]	38-3/4" [985]	37-1/8" [943]	34" [864]	28" [711]	32" [813]
14	51-3/8" [1304]	43-3/4" [1112]	42-1/8" [1070]	39" [991]	33" [838]	36" [915]
16	56-3/8" [1431]	48-3/4" [1239]	47-1/8" [1197]	44" [1118]	38" [965]	40" [1016]
18	61-3/8" [1558]	53-3/4" [1366]	52-1/8" [1324]	49" [1245]	43" [1092]	45" [1143]
20	65-3/8" [1660]	57-3/4" [1467]	56-1/8" [1426]	53" [1346]	47" [1194]	50" [1270]

NOTES:

1. All dimensions in Inches [millimeters]. All dimensions $\pm 1/4"$ [6mm]. Metric values are soft conversion.
2. Right hand unit shown, Left hand unit opposite.
3. Same side control enclosure shown mounted on unit same side as cooling coil connections and includes (4) knockouts on (2) sides. Provide sufficient clearance to access electrical controls and comply with applicable codes and ordinances.

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TITLE:

**MODEL FNP 2-PIPE OR 4-PIPE
W/O ELECTRIC HEAT**

DATE

4/15/2020

SHEET

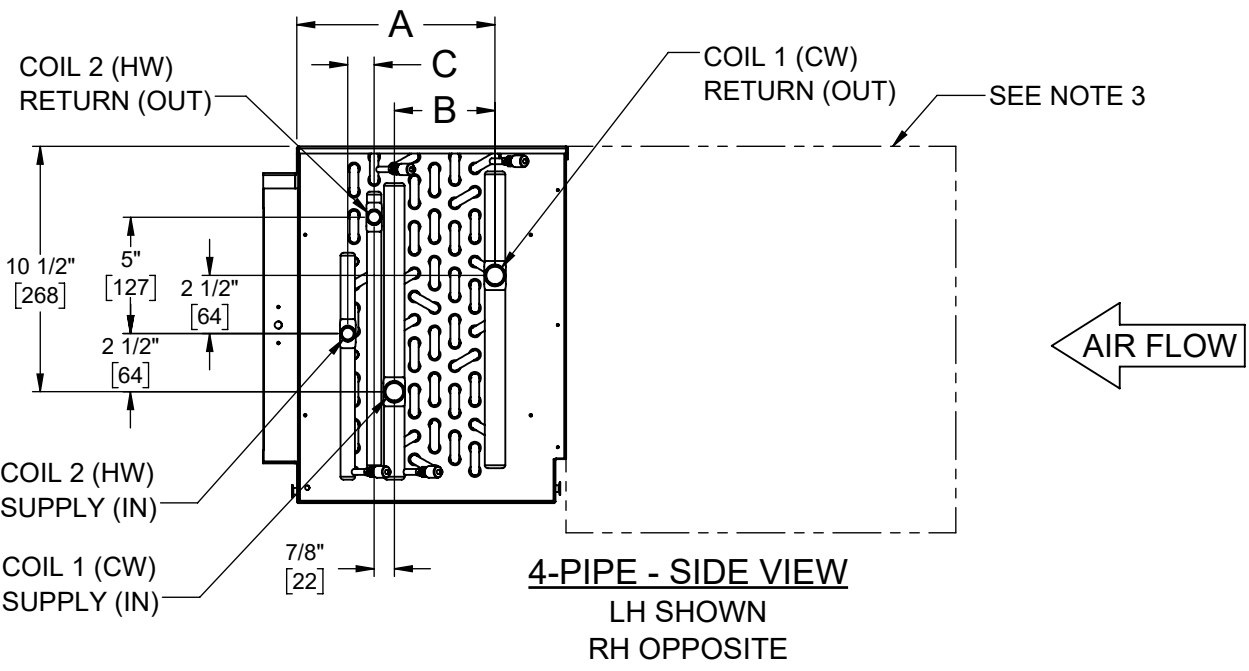
PAGE 2 OF 2

DRAWING NO

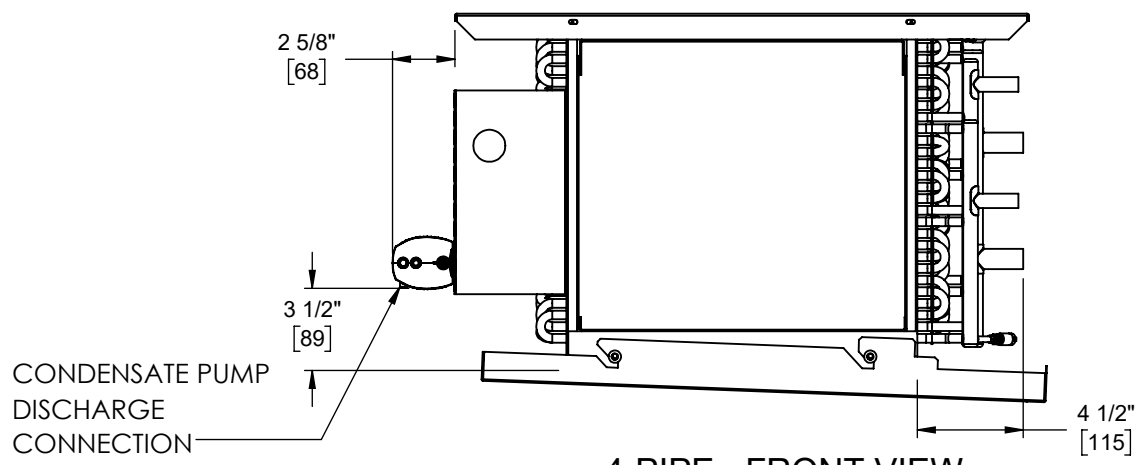
82-80036-J

REV

B



4-PIPE - SIDE VIEW
LH SHOWN
RH OPPOSITE



4-PIPE - FRONT VIEW
LH SHOWN
RH OPPOSITE

Unit Type: 4 Pipe Re-Heat

Coil 1 CW Rows	Coil 2 HW Rows	3/8" Coil ϕ		
		A	B	C
3	1	6-3/4" [171]	1-1/2" [38]	1" [25] \triangle
3	2	6-3/4" [171]	1-3/8" [35]	1" [25]
3	3	6-3/4" [171]	1-3/4" [44]	1-1/2" [38]
4	1	6-3/4" [171]	1-3/4" [44]	1" [25] \triangle
4	2	6-3/4" [171]	2-1/4" [57]	1" [25]
3	4	8-1/2" [216]	1-1/2" [38]	2-5/8" [67]
4	3	8-1/2" [216]	2-5/8" [67]	1-1/2" [38]
4	4	8-1/2" [216]	2-5/8" [67]	2-1/4" [57]
6	1	8-1/2" [216]	3-1/2" [89]	1" [25] \triangle
6	2	8-1/2" [216]	4" [102]	1" [25]

- NOTES:**
- All dimensions are inches [millimeters]
All dimensions $\pm 1/2$ [13mm].
Metric values are soft conversion.
 - All drawings subject to change without notice.
 - Model "HPP" unit shown, typical for model "HPF" units.
Connections shown are internal on "HPE" units.
 - Connection Size: See 82-80053-J Coil Connections.
 - Standard externally foam coated galvanize steel drain pan has 7/8" ODM copper outlet.
Stainless steel drain pan has 3/4" MPT galvanize steel outlet.
 - Aux. drain outlet is 5/8" ODM copper or 3/8" MPT galvanized steel respectively.
 - Single Row/Single Circuit headers are vertical
(Horizontal Distance is 0")

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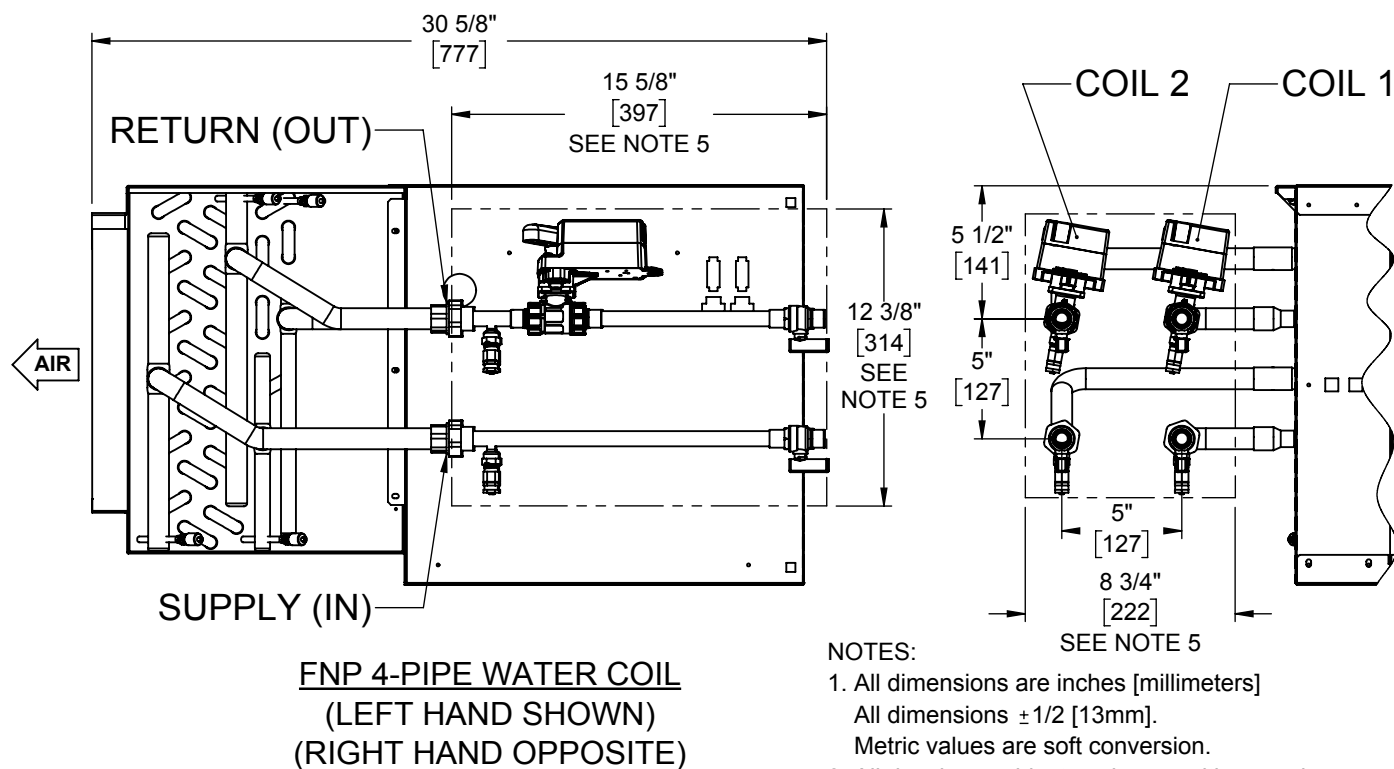
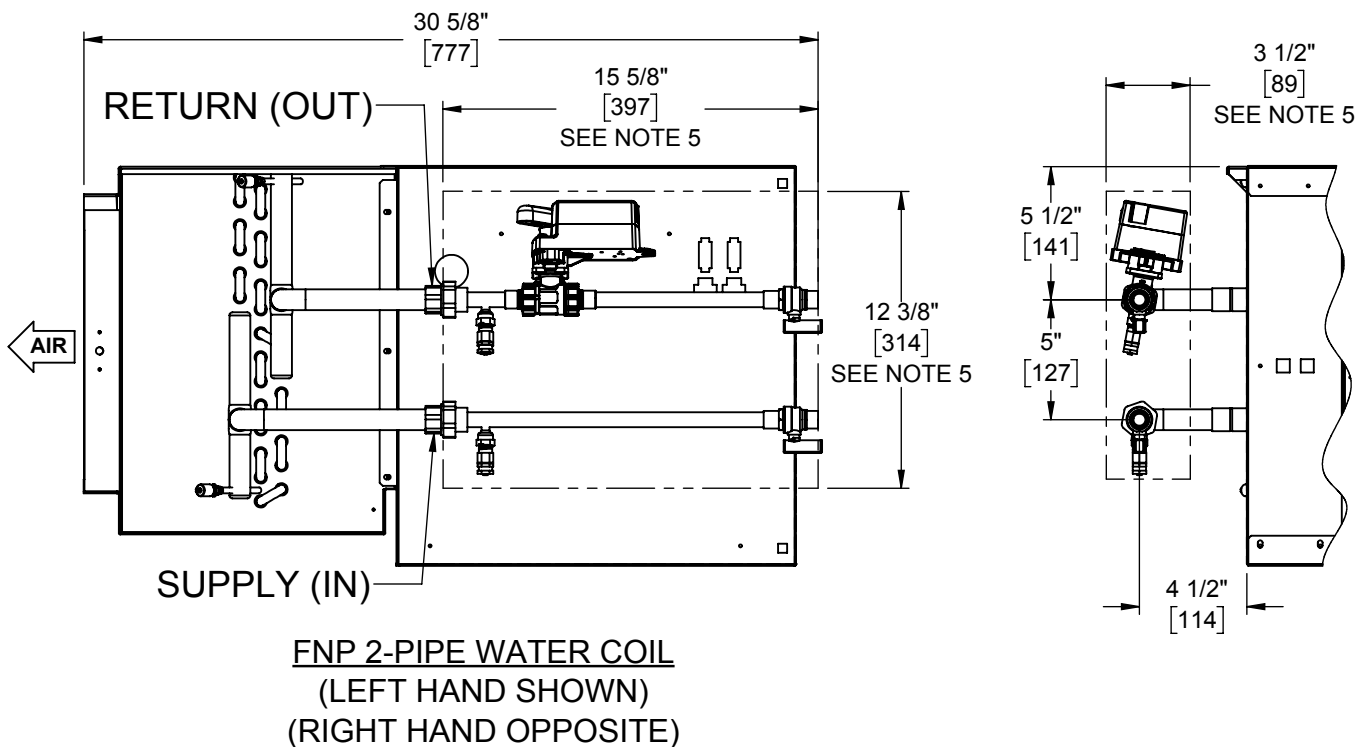


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TITLE: FIELD CONNECTION HPP/HPF		DATE 3/24/22	SHEET PAGE 3 OF 5	DRAWING NO 82-80047-J	REV B
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NOTES:

1. All dimensions are inches [millimeters]
All dimensions $\pm 1/2$ [13mm].
Metric values are soft conversion.
2. All drawings subject to change without notice.
3. See "Coil Connection Location" drawing for drain pan specifications.
4. Consult WebSelect selection summary for valve package components and specifications. Valve package end point dimensions are fixed value, regardless of selected valve package components.
5. Dimensions indicate space requirement for valve-package install. Additional service space requirements depend on option selections.



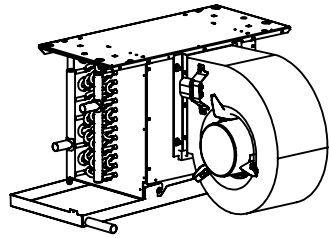
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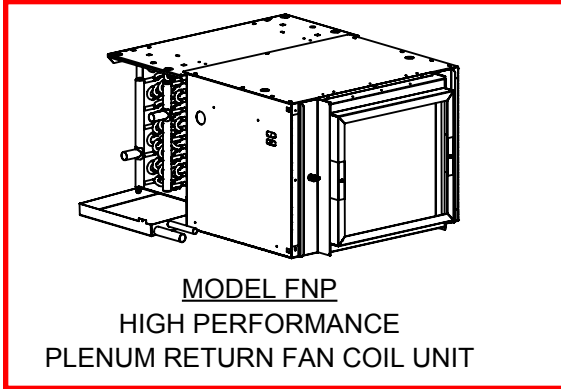
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCH (MM) FORMAT
+/- 1/8 (3) UNLESS OTHERWISE NOTED

TITLE: **MODEL FNP VALVE PACKAGE CONNECTIONS**

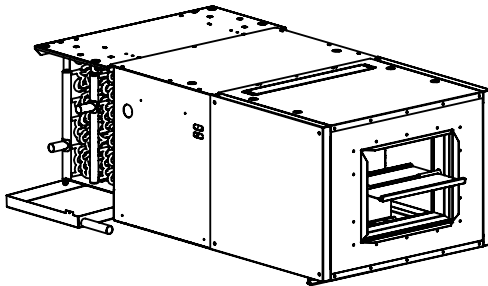
DATE	SHEET	DRAWING NO	REV
10/24/19	PAGE 1 OF 3	82-80051-J	A



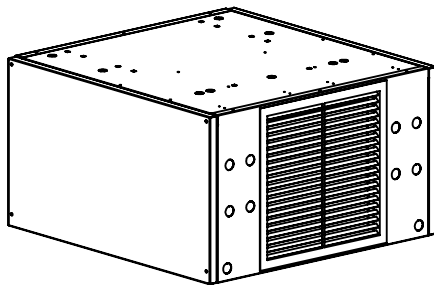
MODEL FNF
HIGH PERFORMANCE
FREE RETURN FAN COIL UNIT



MODEL FNP
HIGH PERFORMANCE
PLENUM RETURN FAN COIL UNIT



MODEL FNP
HIGH PERFORMANCE
PLENUM RETURN FAN COIL UNIT
W/ MIXING BOX



MODEL FNX
HIGH PERFORMANCE
EXPOSED CABINET FAN COIL UNIT

NOTES:

1. Table applies to 1/2" and 3/8" tube diameters.
2. Number of circuits does not affect Coil connection size.

WATER & DX COIL CONNECTION SIZES			
UNIT SIZE	TYPE	# ROWS	CONN. SIZE (OD)
06	HW	1	5/8
06	HW	2	5/8
06	HW	3	7/8
06	HW	4	7/8
06	CW OR DX	3	7/8
06	CW OR DX	4	7/8
06	CW OR DX	6	7/8
08	HW	1	5/8
08	HW	2	5/8
08	HW	3	7/8
08	HW	4	7/8
08	CW OR DX	3	7/8
08	CW OR DX	4	7/8
08	CW OR DX	6	7/8
10	HW	1	5/8
10	HW	2	5/8
10	HW	3	7/8
10	HW	4	7/8
10	CW OR DX	3	7/8
10	CW OR DX	4	7/8
10	CW OR DX	6	7/8
12	HW	1	5/8
12	HW	2	5/8
12	HW	3	7/8
12	HW	4	7/8
12	CW OR DX	3	7/8
12	CW OR DX	4	7/8
12	CW OR DX	6	7/8
14	HW	1	7/8
14	HW	2	7/8
14	HW	3	1 1/8
14	HW	4	1 1/8
14	CW OR DX	3	1 1/8
14	CW OR DX	4	1 1/8
14	CW OR DX	6	1 1/8
16	HW	1	7/8
16	HW	2	7/8
16	HW	3	1 1/8
16	HW	4	1 1/8
16	CW OR DX	3	1 1/8
16	CW OR DX	4	1 1/8
16	CW OR DX	6	1 1/8
18	HW	1	7/8
18	HW	2	7/8
18	HW	3	1 1/8
18	HW	4	1 1/8
18	CW OR DX	3	1 1/8
18	CW OR DX	4	1 1/8
18	CW OR DX	6	1 1/8
20	HW	1	7/8
20	HW	2	7/8
20	HW	3	1 1/8
20	HW	4	1 1/8
20	CW OR DX	3	1 1/8
20	CW OR DX	4	1 1/8
20	CW OR DX	6	1 1/8

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TITLE:

COIL CONNECTIONS FNF/FNP/FNX

DATE

10/09/19

SHEET

PAGE 1 OF 1

DRAWING NO

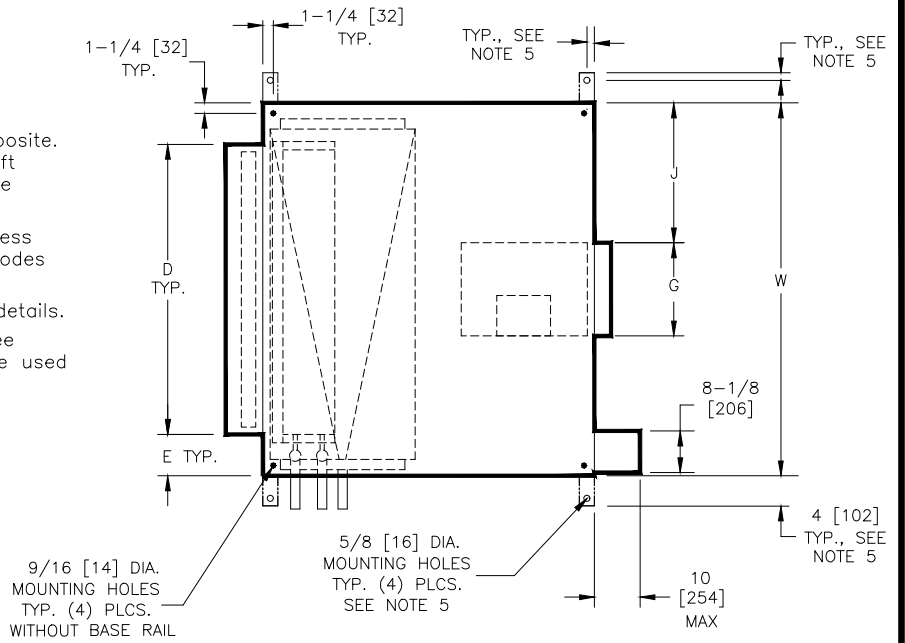
82-80053-J

REV

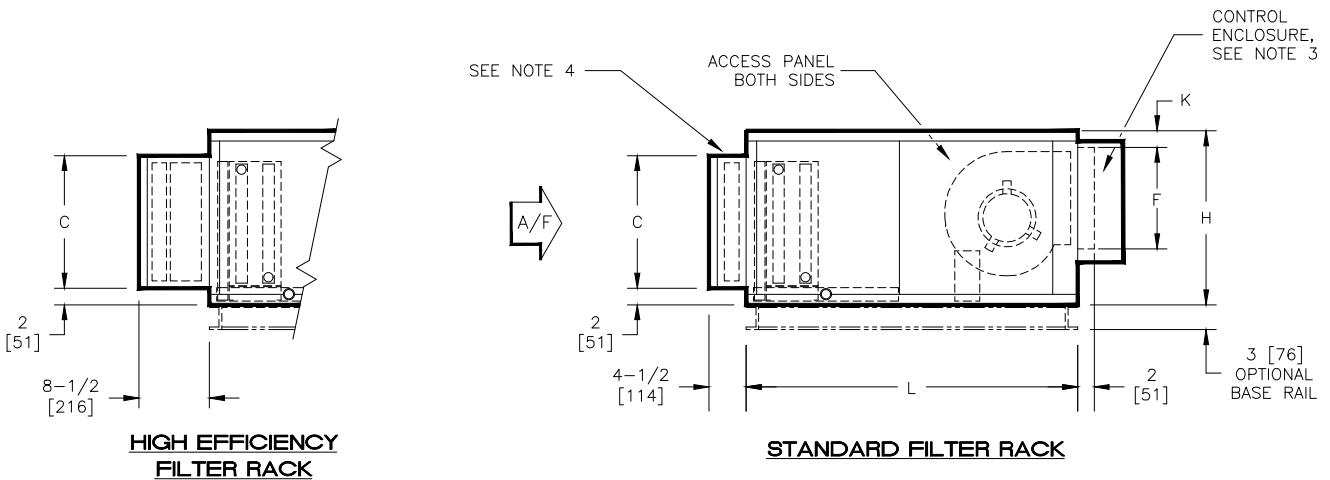
A

NOTES:

1. All dimensions are Inches [millimeters]. All dimensions are $\pm 1/4"$ [6mm]. Metric values are soft conversion.
2. Right hand unit shown, left hand unit opposite. Motor/drive location may be specified Left or Right Hand. Standard control enclosure location matches motor/drive position.
3. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances.
4. See drawing 35-80048-J for filter rack details.
5. Base rail is optional on the base unit. See drawing 35-80050-J. Base rails must be used with mixing box.
6. See coil connection detail drawings for coil connection sizes and locations.



TOP VIEW



SIDE VIEWS

DIMENSIONS

SIZE	FAN SIZE	L	W	H	C	D	E	F	G	J	K
08	9 X 6 [229 X 152]	40 [1016]	30 [762]	21 [533]	16 [406]	20 [508]	5 [127]	10-3/8 [264]	8-3/8 [213]	10-7/8 [276]	2 [51]
12	9 X 6 [229 X 152]	40 [1016]	36 [914]	21 [533]	16 [406]	25 [635]	5-1/2 [140]	10-3/8 [264]	8-3/8 [213]	13-7/8 [352]	2 [51]
16	10 X 8 [254 X 203]	40 [1016]	44 [1118]	21 [533]	16 [406]	39-1/2 [1003]	2-1/4 [57]	11-1/2 [292]	10-5/8 [270]	16-5/8 [422]	2 [51]
20	10 X 8 [254 X 203]	40 [1016]	50 [1270]	22-1/2 [572]	16 [406]	44-1/2 [1130]	2-3/4 [70]	11-1/2 [292]	10-5/8 [270]	19-5/8 [498]	2 [51]
30	10 X 8 [254 X 203]	46 [1168]	59 [1499]	30 [762]	25 [635]	51 [1295]	4 [102]	11-1/2 [292]	10-5/8 [270]	24-1/4 [616]	9-3/4 [248]
40	10 X 8 [254 X 203]	46 [1168]	68 [1727]	30 [762]	25 [635]	59 [1499]	4-1/2 [114]	11-1/2 [292]	10-5/8 [270]	28-5/8 [727]	9-3/4 [248]

TITLE: MODEL AHD
DIRECT DRIVE BLOWER COIL UNIT
DISCHARGE ARG. 3

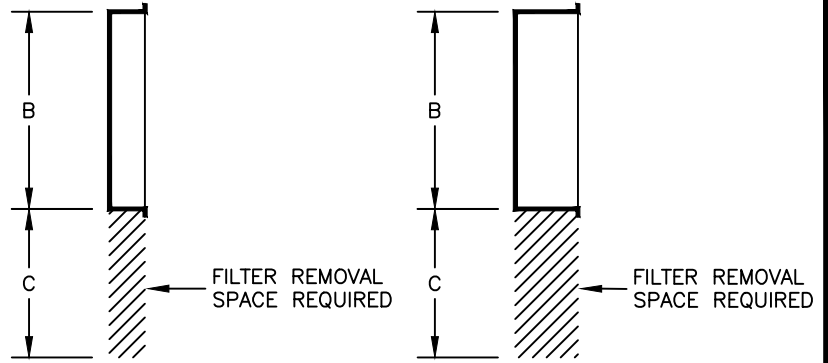
DRN BY: VSC	DATE: 06/14/21	SCALE: NTS	DRAWING NO.
CKD BY: BL	DATE: 06/14/21	REV: B	35-80032-J

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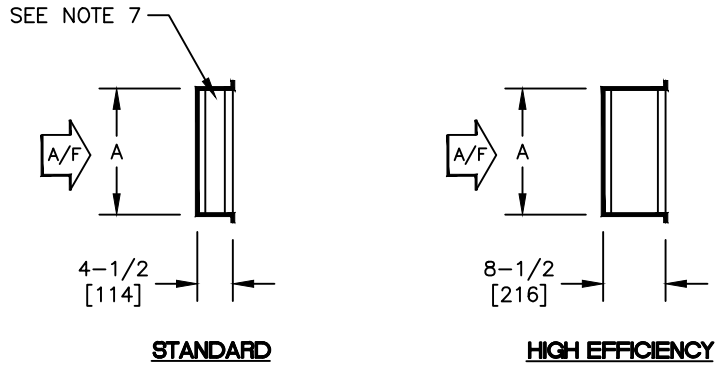
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DIMENSIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.
CONTACT FACTORY FOR CERTIFIED DRAWINGS.

NOTES:

1. All dimensions are Inches [millimeters].
All dimensions $\pm 1/4"$ [6mm].
Metric values are soft conversion.
2. Flat filter rack may be located at unit inlet as required.
3. Standard rack will accept nominal 1" or 2" thick filters.
4. High eff. rack will accept nominal 2" and/or 4" thick filters.
5. High eff. rack not available on "HM" and "VM" units.
6. 1" duct connection space provided on entering side of rack for connection of field ductwork.
7. Hinged cover provided on both sides of externally mounted filter racks. Internal standard filter racks have pivoting bar type filter retainer.
8. See individual unit submittal drawings for location of filter rack on unit.



TOP VIEWS



SIDE VIEWS

DIMENSIONS - In [mm]

UNIT SIZE	A	B	C	QTY & SIZE FILTERS
08	16 [406]	20 [508]	20 [508]	(1) 16 X 20
12	16 [406]	25 [635]	25 [635]	(1) 16 X 25
16	16 [406]	39-1/2 [1003]	20 [508]	(2) 16 X 20
20	16 [406]	44-1/2 [1130]	25 [635]	(1) 16 X 20 (1) 16 X 25
30	25 [635]	51 [1295]	25 [635]	(2) 16 X 25 (1) 20 X 25
40	25 [635]	59 [1499]	25 [635]	(3) 20 X 25

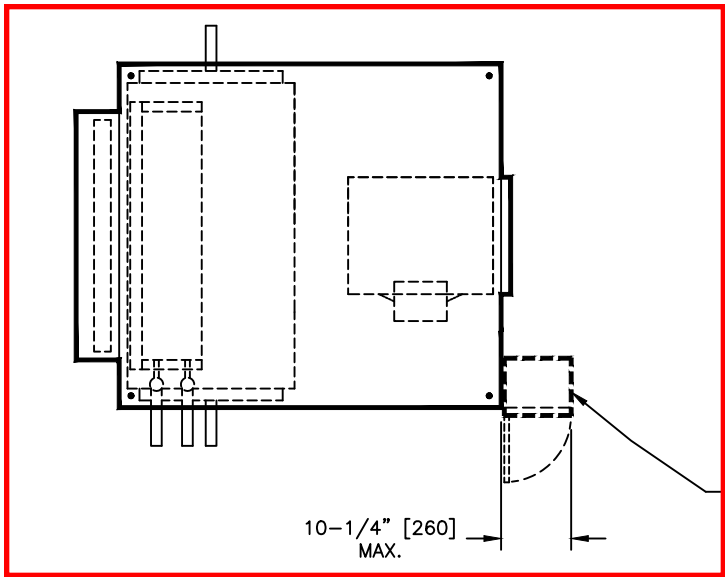


TITLE: MODEL AHD/AVD
DIRECT DRIVE BLOWER COIL UNIT
STANDARD FLAT FILTER RACK

DRN BY: VSC	DATE: 05/07/18	SCALE: NTS	DRAWING NO.
CKD BY: CY	DATE: 05/07/18	REV: 02	35-80048-J

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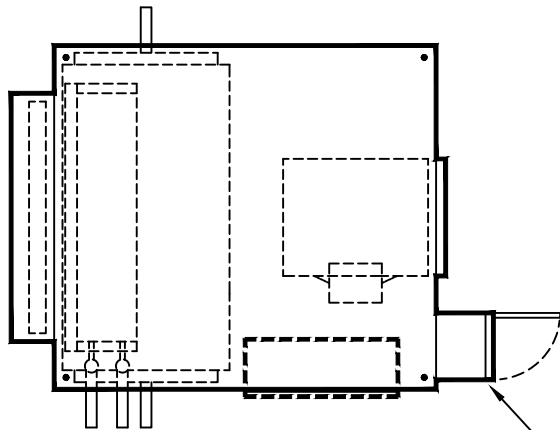
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CONTACT FACTORY FOR CERTIFIED DRAWINGS.



NOTES:

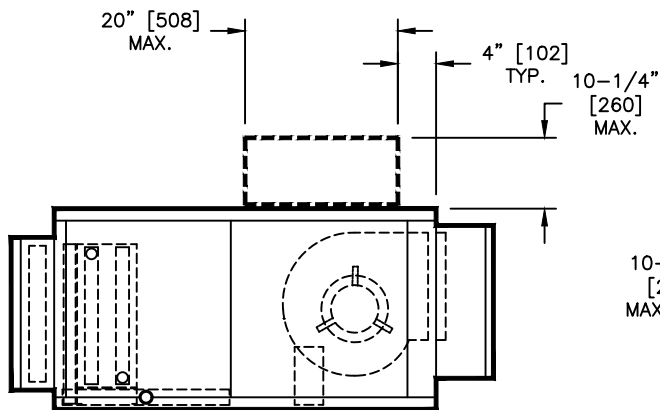
1. All dimensions are Inches [millimeters]. All dimensions are $\pm 1/4"$ [6mm]. Metric values are soft conversion.
2. Right hand unit shown, left hand unit opposite. Motor/drive location may be specified Left or Right Hand. Standard control enclosure and alternate control enclosure locations match motor/drive position.
3. Provide sufficient clearance to permit access to controls and comply with applicable codes and ordinances.
4. Enclosure may overhang unit cabinet up to $1/2"$ [13].
5. Enclosure cover hinging direction may vary.
6. Model AHD unit shown.

ALTERNATE LOCATION 2
(SEE NOTES 2 & 4)

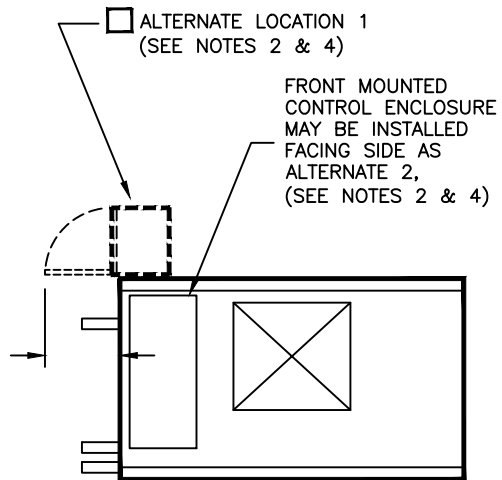


TOP VIEWS

STANDARD CONTROL ENCLOSURE MOUNTING LOCATION, SEE NOTES 2 & 5



SIDE VIEW



FRONT VIEW

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TITLE: ALTERNATE LOCATIONS
CONTROL ENCLOSURE MOUNTING
HORIZONTAL BCU, DIRECT DRIVE

DRN BY: MSS	DATE: 1/10/2020	SCALE: 1=20	DRAWING NO.
CKD BY: NRC	DATE: 1/10/2020	REV: A	

35-80051-J



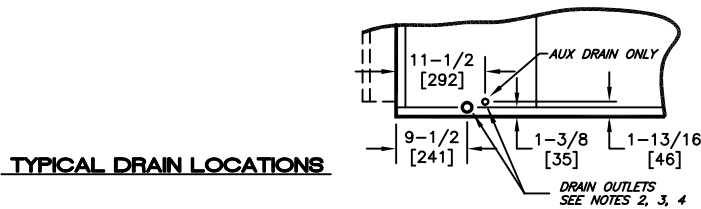
FIG. 1
RIGHT HAND HEATING OR COOLING ONLY LEFT HAND



FIG. 2
RIGHT HAND HEATING + COOLING
HW COIL IN RE-HEAT POSITION LEFT HAND



FIG. 3
RIGHT HAND HEATING + COOLING
HW COIL IN PRE-HEAT POSITION LEFT HAND



- NOTES:**
1. All dimensions are inches [millimeters]. All dimensions are $\pm 1/2"$ [13mm]. Metric values are soft conversion.
 2. Standard galvanized IAQ drain pan has 1-1/8" ODM copper connection on one side.

3. Stainless Steel IAQ drain pan has 1" stainless Sch. 40 threaded steel connection on one side only. Optional Aux connection is 3/8" stainless sch. 40 threaded steel.
4. Horizontal unit shown. Coil connection locations are typical for vertical units relative to lower bottom corner at entering air side.



TITLE:			
BLOWER COIL UNIT WATER HEATING & COOLING COIL COIL CONNECTION LOCATION			
DRN BY: WRG	DATE: 12/03/19	SCALE: 1=22	DRAWING NO.
CKD BY: TW	DATE: 12/03/19	REV: A	CCC-001-J

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WARRANTY

WARRANTY



North America Warranty Certificate

Order Number: TBD
Order Name: TBD
Purchase Order: TBD
Customer:
Sales Person: TBD
Product: JCI
Warranty Start Date: TBD
Extended Warranty: TBD
Warranty Expiration Date: TBD
Warranty Period: 18 Months (*standard*)
Manufacturer: Largo Plant

Manufacturer hereby warrants that its Product and component parts of such Product when not misused or neglected, shall be free from defect in workmanship and material for the Warranty Period.

Written notice specifying in what particular way the Product is defective must be given promptly by Buyer to Manufacturer within the Warranty Period, and Manufacturer shall be the sole judge in determining whether such item of equipment is defective.

RESPONSIBILITY FOR DEFECTIVE PRODUCT IS LIMITED TO REPAIR OR REPLACE AT MANUFACTURER'S SOLE OPTION. NO REPLACEMENT LABOR NOR EXTRANEIOUS LABOR OR MATERIALS RELATED TO THE REPAIR AND REPLACEMENT IS INCLUDED. THIS LIMITED WARRANTY DOES NOT COVER ANY DAMAGE DUE TO: (A) TRANSPORTATION; (B) STORAGE; (C) IMPROPER USE OR INSTALLATION; (D) FAILURE TO FOLLOW THE PRODUCT INSTRUCTIONS OR TO PERFORM ANY PREVENTIVE MAINTENANCE; (E) MODIFICATIONS; (F) UNAUTHORIZED REPAIR; (G) NORMAL WEAR AND TEAR; OR (H) EXTERNAL CAUSES SUCH AS ACCIDENTS, ABUSE, ACTS OF GOD OR OTHER ACTIONS OR EVENTS BEYOND MANUFACTURER'S REASONABLE CONTROL.

THE REMEDIES DESCRIBED ABOVE ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES AND MANUFACTURER'S ENTIRE LIABILITY FOR ANY BREACH OF THIS LIMITED WARRANTY. MANUFACTURER LIABILITY SHALL UNDER NO CIRCUMSTANCES EXCEED THE ACTUAL AMOUNT PAID BY BUYER FOR THE DEFECTIVE PRODUCT, NOR SHALL MANUFACTURER UNDER ANY CIRCUMSTANCES BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, SPECIAL OR PUNITIVE DAMAGES OR LOSSES, WHETHER DIRECT OR INDIRECT.

Unless expressly agreed to in the contract documents, this Limited Warranty does not include the following costs and expenses: (A) labor to remove or reinstall any equipment, materials or components or services charges related thereto; (B) shipping, handling, or transportation charges, including cranes, safety walks or other safety requirements specific to jobsites; (C) cost of refrigerant; (D) freight damage; (E) field applied coatings added to any surface or heat exchanger; or (F) rental equipment.



The Limited Warranty is void if: (A) Product has been damaged by freezing because it was not properly protected during cold weather or damaged by fire or any other conditions not ordinarily encountered; (B) Product is not installed, operated, maintained and serviced in accordance with instructions issued by Manufacturer; (C) Product is damaged due to dirt, air, moisture or other foreign matter entering the equipment; (D) Product is not properly stored, protected or inspected by the customer during the period from date of shipment to date of initial start-up; (E) Field coating of coil has occurred; (F) Product is damaged due to acts of God, abuse, including shipping damage, neglect, sabotage, or acts of terrorists; (G) Product has modifications carried out that have an effect on the original design of the Product without such work being authorized by Manufacturer. Any on-site design changes or unit modification/replacement shall be authorized in advance by Manufacturer.

This Limited Warranty starts on Warranty Start Date and lasts until the Warranty Expiration Date. The Warranty Period is not extended if Manufacturer repairs or replaces the Product. Manufacturer may change this Limited Warranty's availability at Manufacturer discretion, but any changes will not be retroactive.

The Limited Warranty does not apply to (i) any defect in components of the Products not manufactured by Manufacturer; and (ii) any Products manufactured according to Buyer's specifications. Products or components manufactured by any supplier other than Manufacturer shall receive only such a warranty, if any, as is given by the manufacturer thereof.

Manufacturer makes no other express warranty (except such warranties or performance guarantees, if any, as may be made in any written proposal to Buyer, and then only when a duly authorized representative of Manufacturer signs such proposal or separate warranty) and makes no implied warranties with respect to such Product.

The Limited Warranty stated above and those referred to above, if any, are in lieu of all other warranties, including the warranties of merchantability and fitness for a particular purpose.

Manufacturer assumes no responsibility for the labor involved in removing defective parts, installing new parts, or service charges related thereto. Limited Warranty replacement parts may be, at Manufacturer's sole discretion, remanufactured or new components. The return of any Products to Manufacturer without first receiving written permission from Manufacturer is prohibited. All products returned to Manufacturer shall be shipped with transportation charges prepaid.

All warranty claims will be treated with diligence and promptness by Manufacturer. Allowance for any repairs or alterations made by Buyer is subject to Manufacturer's prior written consent. If such repairs are made without such consent, Manufacturer's warranty shall terminate at the time of such repairs.

ORDERING GUIDELINES

I. Replacement Parts Ordering Guidelines

The Buyer must enter a complete and accurate parts order for any warranty part(s) required. The original Manufacturer order number must be included. All pertinent information must be included: purchase



order number, ship-to address, tagging and contact information, replacement part number, and ordering office and salesperson names. Check the order type as a "Warranty." All warranty replacement parts are warranted to the original owner to be free from defects in material and workmanship during the Warranty Period, subject to all terms, conditions and exclusions set forth in this Limited Warranty document.

II. Return of Failed Parts

Replacement parts will be invoiced to your account. In order to receive credit for the warranty replacement parts, the failed parts must be returned to Manufacturer within 90 days from the replacement part ship date with the following exceptions. If at 90 days the part has not been received at the factory, the parts invoice is due. Returned parts will not be accepted for credit after 90 days.

- A. Secondary limits are warranted for a period of (6) months from the date of the original product shipment.
- B. Replacement parts will ship full freight allowed.

III. Warranty Components That Must Be Returned For Credit

The following conditions must be met in order to qualify for credit for a failed part.

- A. Defective parts must be returned within 90 days from the date of shipment of replacement parts. Warranty parts invoices over 90 days old are due and payable immediately.
- B. Return parts must be accompanied by one of the following:
 - 1. Packing list copy of replacement parts invoice – if returned directly from your customer.
 - 2. Copy of replacement parts invoice – if you (Buyer) are returning the parts.
 - 3. If you have replaced defective part(s) from your stock on a project in warranty, a parts order must be placed identifying the original CO#. The defective part(s) can be returned once you have the packing slip or a copy of the replacement parts slip. NOTE: Do not return defective parts without first ordering a replacement.
- C. Parts must be packed with reasonable care. Damage that occurs in shipment may mask the original cause of failure and cause our vendors to deny the warranty. Ship freight prepaid to the attention of: **Warranty Returns Department Johnson Controls, Inc., 8575 Largo Lakes Blvd., Largo, FL 33773**

Pack each return by job, with appropriate paperwork. If possible, avoid partial returns. If unavoidable, you must include a copy of the packing slip and/or invoice with each shipment of returned parts.

NOTE: Credit cannot be issued for any return shipment received without proper accompanying paperwork. Paperwork is essential for identification. Any parts returned without documentation will be discarded (15) days after notification is given to the Buyer office. If the Buyer office is unidentifiable, no credit will be given.

IV. Warranty Disposition

The final disposition of any warranty claim will be determined solely by Manufacturer. If after inspection by Manufacturer Warranty Returns Department, it is apparent that improper application, misuse, or lack of maintenance has caused the product(s)' failure, the warranty will be voided and no credit issued. The appropriate disposition of returned parts will be determined as follows:



A. Defective Parts

1. Parts found to be defective in workmanship or materials will be credited based on the Buyer's invoiced cost, including standard ground freight.
2. No credit in lieu of shipping a replacement part will be issued.

B. Operational Parts

Parts found to be operational will be returned to the Buyer and no credit will be issued.

V. Unidentified Parts and Parts That Are Out-of-Warranty

The Buyer must contact the factory in order to obtain authorization for any return of a non-warranty product(s) for special consideration. If written authorization is obtained, the procedure for warranty product(s) will apply.

Parts received without appropriate paperwork or outside the warranty period will be held for 15 days after notice of pending disposal has been sent to the Buyer if the Buyer can be identified. The Buyer will be given the option of the parts being returned and paying for freight and handling charges.

SAMPLE WARRANTY

EQUIPMENT RELEASE APPROVAL FORM

The following tables must be completed prior to releasing the equipment for fabrication:

SUBMITTAL VERIFICATION	
<u>Instructions:</u> Please initial the column indicating the information contained in this submittal has been verified, or indicate to refer to a marked up page.	
	Purchaser Initials:
Electrical voltage and electrical connections are compatible with jobsite requirements.	
Ductwork connections shown in this submittal are correct.	
Unit tag designations are correct.	
Equipment dimensions (length, width, and height) and weights have been verified to comply with jobsite conditions and rigging requirements. Please indicate approval by your initials on all included drawings.	
Verify unit handing/arrangement of all units per the definition and drawings provided in the "FCU Configurations" section.	

EQUIPMENT RELEASE APPROVAL FORM – MUST BE RETURNED TO JCI

Important Notes:

1. Actual fabrication release cannot commence until this form is signed by the customer and returned to JCI along with a release notification want date and ship to address.
2. Equipment lead time does not start until confirmed release documentation is received, and the order is actually released to the factory.
3. Modifications to equipment configurations after fabrication release may impact cost and lead time.
4. Attached configurations are as shown in the approved equipment submittals or as defined in superseding customer correspondence.
5. Note that once this document is confirmed, the equipment configurations defined by this document take precedence over all other documents.
6. Want date and/or ship to address changes made after this document is confirmed may impact cost and lead time.

DELIVERY INFORMATION

Instructions: Please fill out the following table and refer to the receiving/rigging instructions in the equipment IOMs to help ensure a smooth delivery and installation of the equipment.

Please fill out information below:	
Contact name for coordinating delivery of equipment with transportation company	
Contact phone number	
Advance notice required from transportation company prior to equipment delivery (typically 48 hours)	
Ship-to address	
Requested delivery date (NOTE: Subject to factory lead time)	
Other special shipping instructions or requirements	

CUSTOMER APPROVAL:

Customer Name: _____

Signature: _____

Date: _____